



SUPPLEMENT

TO THE

NEW ZEALAND GAZETTE

OF

THURSDAY, DECEMBER 11, 1930.

Published by Authority.

WELLINGTON, MONDAY, DECEMBER 15, 1930.

RULES FOR EXAMINATIONS

OF

MASTERS AND MATES.

Marine Department,
Wellington, 10th December, 1930.

IN pursuance and exercise of the powers vested in me by section 23 of the Shipping and Seamen Act, 1908, I do hereby make the following rules for the conduct of examinations of masters and mates, and as to the qualifications of applicants; and I do direct that the fees specified therein shall be paid to the Superintendents of Mercantile Marine at the ports where the applications to be examined are made. These rules shall come into force on the 1st day of January, 1931, and shall then supersede any rules or regulations heretofore existing and affecting such examinations, qualifications, and fees.

JAS. B. DONALD,
Minister of Marine.

CHAPTER I.

PRELIMINARY AND GENERAL.

1. Masters and Mates must have Certificates.—In accordance with the provisions of section 21 of the Shipping and Seamen Act, 1908, every British ship when going to sea or plying from any place in New Zealand, and every foreign ship when plying as a home-trade ship, shall be provided with deck officers duly certificated under this Act according to the following scale :—

- (a) In any case, with a duly certificated master.
- (b) If the ship is a home-trade sailing-ship of 100 tons register or upwards, or a home-trade steamship of 60 tons register or upwards, then with at least one officer besides the master, such officer holding a certificate not lower than that of mate (home-trade) or a second mate (foreign-going): Provided that any such ship of 100 tons register or upwards running more than 300 miles between terminal ports shall carry a second mate holding a certificate not lower than that of second mate of a home-trade ship or of master of a fishing-boat or of a cargo vessel under 25 tons register: Provided also that the Secretary of the Marine Department may, if and subject to such conditions as he thinks fit, exempt any ship from the requirements of the preceding proviso in respect of any particular voyage if it is proved to his satisfaction that to comply with those requirements would unduly delay that ship.
- (c) If the ship is a foreign-going ship, then with at least a first and a second mate duly certificated.
- (d) If the ship is a steamship authorized to ply within river limits or extended river limits only, then with a master holding a certificate as master of a river steamer.
- (e) If the ship is a home-trade cargo ship only of over 5 tons or up to 25 tons (inclusive) net register, then with a duly certificated master whose certificate shall be of a grade not lower than that prescribed for that class of ship by the next succeeding section.
- (f) If the ship is a home-trade ship over 25 and up to 100 tons net register, and not included in the foregoing provisions, then with a duly certificated master whose certificate shall be of a grade not lower than that of a master of a home-trade ship.

By a "home-trade ship" is meant one which is employed in trading or going between any port or place in New Zealand, or plying on any navigable waters in New Zealand, or going to sea from any port or place in New Zealand and returning to New Zealand without going more than fifty miles from the coast thereof, but not to or from the Cook Islands, Kermadec Islands, the Chatham Islands, the Auckland Islands, Campbell Islands, Antipodes Islands, or Bounty Islands.

By a "foreign-going ship" is meant every ship not included in the term "home-trade ship."

- (g) If the ship is a sailing-ship, or a ship propelled by any mechanical power other than steam, plying on a river or in a harbour or within other restricted limits, then with a duly certificated master whose certificate shall be of a grade prescribed by the Minister.
- (h) If the ship is a fishing-boat over 10 tons register exclusively employed in fishing on the coasts of New Zealand, whether sea-going or running within river or extended-river limits, then with a duly certificated master whose certificate shall be of a grade prescribed by the Minister.

An officer is not duly certificated unless he is the holder for the time being of a valid certificate of competency (or service) under the Shipping and Seamen Act of a grade appropriate to his station in the ship or of a higher grade.

If any person having been engaged as one of the above-mentioned officers goes to sea as such officer without being duly certificated, or if any person employs a person as an officer in contravention of this section without ascertaining that the person so serving is duly certificated, that person shall be liable for each offence to a fine not exceeding £50.

A certificate for a sailing-ship shall entitle the holder to serve in a steamship, or ship propelled by mechanical power other than steam, in the capacity mentioned in the certificate.

In any case not provided for in these regulations, the regulations made by the Board of Trade of the United Kingdom, and for the time being in force, relative to the examination of masters and mates for certificates shall, to the extent to which they are applicable to the matter, be deemed to be embodied in these regulations, and shall be observed.

2. Certificates granted to Persons who pass Examinations.—Certificates of competency will be granted to those persons, being British subjects, who pass the requisite examination and otherwise comply with the requisite conditions. For this purpose Examiners have been appointed, and arrangements have been made for holding examinations.

3. Birth or Naturalization.—A British subject is one who is a British subject by birth or by naturalization in New Zealand.

4. How to apply.—Candidates for examination must fill up a form of application (form Exn. 2) at a Mercantile Marine Office. The form, properly filled in, together with the candidate's testimonials in duplicate, discharges, birth, first-aid and watch-keeping certificates, should be lodged with the Superintendent of the Mercantile Marine Office for transmission to the Principal Examiner at least a week before the day of examination; and the candidate must conform to any regulations in this respect which may be laid down by the Marine Department. It is important that this procedure should be observed, as discharges and testimonials may have to be submitted to the Marine Department for verification.

The Examiner must be particularly careful to ascertain that any gaps in the candidate's service are properly accounted for, that his testimonials and discharges have been verified (where such has been necessary), and that he has conformed to the requirements of these regulations, before he is allowed to sit for examination. In the absence of any necessary verification the candidate must not be examined.

A candidate who has failed in his examination and desires to again sit for examination, provided examinations are to be held during the next succeeding week, and provided he is eligible to sit, may make immediate application for such in the manner required by this regulation, notwithstanding a lesser period than seven days may elapse before the date of examination.

5. Proof of Nationality.—Every candidate for a certificate of competency of any grade will be required to produce proof of nationality.

Proof of British nationality will, in ordinary circumstances, involve the production of a birth certificate or of a certificate of naturalization. If an applicant for examination cannot produce such a certificate, he should be asked to furnish such documentary evidence of nationality, or of birth and nationality of parents, as he may be able to obtain: such a case should be referred to the Principal Examiner for consideration.

6. How to apply in Special Cases.—In cases where the services of a candidate require verification, or where he is in doubt whether his service complies with the regulations, and wishes to submit his case for special consideration, all certificates, discharges, testimonials, and watch-keeping certificates, together with the form of application (Exn. 2) properly filled in, should be submitted to the Superintendent of the Mercantile Marine Office. If necessary the officer will, after seeing that all the required information is clearly set forth in the papers, forward them with his observations to the Principal Examiner, who will either deal with the case or transmit it to the Marine Department for decision.

7. Inquiries.—All other inquiries regarding examinations should be made and dealt with in the same way. The point on which information is sought should be clearly stated, and certificates, discharges, testimonials, &c., should always be forwarded when they are material to the inquiry.

8. Application : Particulars of Sea Service.—(1) A candidate's eligibility for examination will depend (amongst other things) upon the amount of sea service which he has performed and upon the ranks which he has held on board the various vessels in which he has been employed. It is therefore most important that the particulars which the candidate inserts in Division G of the application form (Exn. 2) should be accurately stated. Candidates who represent themselves as having served in a higher capacity than that actually held in the ship render themselves liable to prosecution under section 32 of the Shipping and Seamen Act, 1908. (See para. 9).

(2) Candidates for certificates, for which service as watch-keeping officer is required, must also produce certificates of watch-keeping service signed by the masters of the vessels on which they have served. Specimen forms of these certificates are shown in Appendix J.

(3) All candidates for certificates of competency and for the voluntary examinations must submit all existing certificates held by them, whether of master, mate, or engineer, issued under the various Shipping and Seamen and Navigation Acts, as such certificates are required by the Marine Department either for endorsement or cancellation purposes. All such certificates must be described by the candidate in section (b) of his application form (Exn. 2).

(4) It must be clearly understood that the amount of service laid down in the regulations for each grade of certificate of competency is the absolute minimum that can be accepted, and unless a candidate can show the full amount he must in no case be allowed up for examination.

9. Fraud and Misrepresentation.—It is provided by section 32 of the Shipping and Seamen Act, 1908, that any person who makes, assists in making, or procures to be made, any false representation for the purpose of procuring either for himself or for any other person a certificate of competency or service, or the grant of any such certificate shall, in respect of each offence, be guilty of a crime the punishment for which is imprisonment for any period not exceeding two years, or a fine not exceeding one hundred pounds.

10. Testimonials required.—In addition to the necessary certificates of discharge submitted for proof of sea service, a certificate of character must be produced in respect of any lengthy intervals or gap embraced by or subsequent to the period of qualifying service; and every candidate will be required to produce testimonials (to be submitted in duplicate) as to character, including sobriety, and to experience and ability on board ship for at least the twelve months of sea service immediately preceding the date of application to be examined, and without producing these no person will be examined. The duplicates of such testimonials will be retained by the Marine Department.

11. Penalty for Misconduct.—Candidates who have neglected to join their vessels after having signed articles, or who have deserted their vessels after having joined, or who have been found guilty of gross misconduct on board, will be required to produce satisfactory proofs of two years' subsequent service and good conduct at sea, unless the Marine Department, after having investigated the matter, should see fit to reduce the time.

12. Deafness and other Physical or Mental Disabilities.—If during the progress of the examination the Examiner finds that a candidate is afflicted with deafness, with an impediment in his speech, or with some other physical or mental infirmity, and he is satisfied upon further investigation that the degree of deafness or of the impediment or other infirmity is such as to render the candidate incompetent to fully discharge the ordinary duties of a mate or master at sea, he should not allow the candidate to complete his examination, and the candidate shall have his examination fee returned to him; but every case in which this action is taken must be reported to the Marine Department.

If the candidate subsequently produces a medical certificate to the effect that his hearing, speech, or physical or mental condition has improved or is normal, the Marine Department will take into consideration the question of allowing the candidate to sit again for examination.

13. Naturalized British Subjects must know English.—Naturalized British subjects must prove to the satisfaction of the Examiners that they can speak and write the English language sufficiently well to perform the duties required of them on board a British vessel. If a candidate fails for ignorance of the English language he will not be re-examined until after a lapse of six months.

14. Issue of Certificate.—If the candidate passes he will receive a form (Exn. 16) authorizing the Superintendent of the Mercantile Marine Office to whom it is addressed to issue the certificate. It is, therefore, important that the port at which the certificate is to be issued should be the same on both the form Exn. 16 and the form Exn. 2. If circumstances should make any alteration necessary, the Examiner should see that it is made in both forms, otherwise delay in the issue of the certificate may be caused. If the candidate passes in part of the examination only, he will receive from the Examiner a record of his passing in the form Exn. 16B. The candidate must retain this form and produce it to the Examiner when he next presents himself for examination.

15. Service found to be insufficient, &c.—If during the progress of or after the candidate has passed the examination it is discovered on further investigation that a discrepancy exists in any of his credentials, or that his services are insufficient to entitle him to receive a certificate for the grade for which he has passed, the certificate will not be granted; but, if the Marine Department is satisfied that the discrepancy or the error in calculating the candidate's service did not occur through any fault or wilful misrepresentation on his part, he may either have the fee returned to him or have it placed to his credit. Should his services entitle him to a certificate of a lower grade it may be granted to him, and the difference, if any, between the fee paid by him for the superior certificate and the fee payable for the inferior certificate will be returned to him or placed to his credit. The superior certificate will not be granted until the candidate has performed the amount of service in which he was deficient, and has been re-examined in all the subjects prescribed for such superior certificate, unless the Marine Department sees fit to dispense with the re-examination.

If, however, the discrepancy or the error in calculation has been caused by the candidate's wilful fault or wilful misrepresentation on his part the certificate for which he has passed will not be granted.

16. Certificates of Service.—A person who has attained the rank of Lieutenant in His Majesty's Navy, or in His Majesty's Indian Marine Service, is entitled to apply for a certificate of service as Master of a foreign-going ship without examination.

Applications for certificates of service must be made on the proper printed form, to be obtained free of charge from the Superintendent of any Mercantile Marine Office.

Applications for certificates of service by officers of the Royal Navy on the active list must be made through their commanding officers, and applications from officers who have retired from the Royal Navy or who are on half-pay must be made to the Secretary of the Admiralty, who in either case will forward the application to the Board of Trade.

17. Examination of Officers in Royal Navy.—Officers of the Royal Navy may be examined for certificates of competency on the same conditions as officers in the Mercantile Marine, but the Lords Commissioners of the Admiralty have directed that the applications of officers wishing to be so examined should be made, if on the active list, through their commanding officers, and, if on half-pay, direct to the Secretary of the Admiralty, who, in either case, will forward the application to the Board of Trade.

18. Failure in the Written or the Oral Part of the Examination.—Candidates for any grade of certificate will proceed to the oral examination irrespective of whether they have passed or failed in their written work.

Where a candidate passes in the written portion of the examination and fails in the oral, or *vice versa*, his pass in that portion in which he has satisfied the examiners will hold good for a period of six months from the date of the examination. If he does not pass the remainder of the examination within this period he will again be required to be examined both in the written and in the oral portions. The Marine Department may in exceptional circumstances decide to extend this period up to a limit of one year.

19. Penalties for Failure.—In the case of a second failure or any subsequent failure in the written or the oral portion of the examination, or in both, an interval of two months must elapse from the date of the last failure before a candidate can be re-examined, excepting certain circumstances under which he may be re-examined after a period of seven weeks. No further penalty will be imposed save in those cases where the Examiner considers further sea service necessary. Such sea service will not exceed six months.

When a candidate fails in the oral portion of the examination the Examiner, in making his report on the form Exn. 14, should state whether any further sea service must be performed by the candidate, and he should also insert this information in the form Exn. 2.

Inability to repeat verbatim the Articles of the Collision Regulations will not entail failure in the oral examination if the candidate understands the full significance, content, and practical application of the articles.

20. Examination in Signalling.—A candidate who is eligible for examination for any grade of certificate for which signalling is required may take this part of the examination at any time within the six months immediately before or after he presents himself for examination in the written and oral portions.

A candidate who fails in signalling but passes in every other subject may, at any time within the six months following his first attempt, be re-examined in signalling only, and, if he then passes, will receive his certificate of competency.

Subject to the above conditions, a candidate may be allowed to take the signalling examination in any week during which examinations of masters and mates are being held at the port, but a fee for this examination (see para. 27) must be paid for each separate attempt.

21. Procedure to be followed by the Examiner when a Candidate is examined in One Part of the Examination only.—On every occasion when a candidate takes the Signalling Examination apart from the written and oral examination for a certificate of competency, a separate form Exn. 2 must be filled in. The result of the examination should be reported to the Principal Examiner on the form Exn. 14, the entry "Passed" or "Failed" being made in the appropriate column and the words "Not examined" or "Previously passed," as the case may be, entered in the columns headed "Written" and "Oral." The form Exn. 2 should be forwarded to the Principal Examiner and the result of the examination reported thereon.

A similar procedure should be followed when a candidate is re-examined in the written or oral portion of the examination only.

In all cases when a candidate passes in the written, oral, or signalling portion of the examination after previously passing in the other two portions, the Examiner, on being satisfied as to the facts, should report the result of the examination, and issue his authority on the form Exn. 16 in the usual way.

22. Failure in Voluntary Examination.—(1) Candidates for certificates as extra master will not be allowed to present themselves for examination more than twice within a period of twelve months.

(2) Candidates for the voluntary examination in compass deviation will not be allowed to present themselves for examination more than twice within a period of six months.

(3) Candidates for the voluntary examination in signalling may present themselves for examination at any time when scheduled examinations are being held. (See Appendix A.)

23. Candidates failing may be examined for Certificate of Lower Grade.—If a candidate fails in his examination for a foreign-going certificate, and the subjects in which he has failed are not included in the syllabus prescribed for a foreign-going certificate of a lower grade, he may, if he so desires, be examined for the lower-grade certificate without further formal application or payment of fee, but he will be required to complete the whole of the work prescribed for such lower grade.

If a candidate fails for the Extra Master's Certificate he may also, without further formal application or payment of fee, proceed with the examination for the Master's Certificate, but, in this case, the whole of the examination prescribed for the lower grade will have to be completed irrespective of any work which may have been done under examination for the Extra Certificate. The subsequent examination for the lower grade may, if time permits, be taken during the current week; but, should the time be insufficient, the candidate will be allowed to sit at the next following scheduled examination at the port, or as may be directed by the Principal Examiner (see Appendix A).

No part, however, of the fee he has paid will be returned to him, and on presenting himself, when qualified, for re-examination for the higher certificate, he will be required to pay a further full fee.

24. Fee always paid first.—Applicants for examination, and persons inquiring as to their eligibility, will be required, in making their application on form Exn. 2, to pay the examination fee before any step is taken in the way of inquiring into their services or testing their qualifications. If the candidate is found not to be eligible the fee will either be returned to him or placed to his credit until he is eligible.

25. Where to pay Fees.—The fee for examination must be paid to the Superintendent of the Mercantile Marine Office. If a candidate offers a gratuity to any officer of the Department, he will be regarded as having committed an act of misconduct, and will be rejected and not allowed to be again examined for twelve months either at the port where the offence was committed or at any other port.

26. Fee in Case of Failure.—The fee paid for examination for a certificate of competency includes the fee of 2s. 6d. for examination in the sight tests, and if the candidate fails to pass those tests the fee will, with the exception of 2s. 6d., be returned to him.

If a candidate fails to pass any other part of the examination no part of the fee will be returned to him.

27. Fees, Table of—

FOR FOREIGN-GOING SHIPS.		£	s.	d.
Second Mate	.. .. .	1	0	0
First Mate	.. .. .	0	10	0
Master or Extra Master	.. .. .	2	0	0

If signalling examination is taken separately, 5s. will be payable when making the application; the balance to be paid when application is made for the remainder of the examination.

Sailing-ship endorsements—

Where a candidate is examined for a sailing-ship endorsement at the same time as for a certificate of competency of the same or of higher grade .. No fee.

If examined separately .. Half the usual fee, with a minimum of 10s.

FOR HOME-TRADE SHIPS.		£	s.	d.
Second Mate	.. .. .	0	10	0
First Mate	.. .. .	0	10	0
Master	.. .. .	1	0	0
Master of a cargo vessel under 25 tons register	.. .. .	0	10	0
Master of a fishing-boat	.. .. .	0	10	0

If signalling examination is taken separately, 5s. will be payable when making the application; the balance to be paid when application is made for the remainder of the examination.

FOR RESTRICTED-LIMIT SHIPS.		£	s.	d.
Master of a river steamer	.. .. .	1	0	0
Master of a harbour sailing-ship	.. .. .	0	10	0

VOLUNTARY EXAMINATIONS.		£	s.	d.
Voluntary examination in compass deviation	.. .. .	1	0	0
Voluntary examination in signalling—				
If taken at the same time as the examination for a certificate of competency	.. .. .			No fee.
If taken at any other time	.. .. .	1	0	0

FOR YACHTS.		£	s.	d.
Master	.. .. .	2	0	0
Master in New Zealand waters	.. .. .	1	0	0

Where candidates for certificates of competency are re-examined in written and oral parts .. Full fee, less 5s.
 In written part or in oral part .. Half usual fees.
 In signalling 0 5 0

SIGHT TESTS.		£	s.	d.
Examination in sight tests only	.. .. .	0	2	6

28. Lost Certificate, Copy of.—Any master or mate who proves to the satisfaction of the Marine Department that he has lost or been deprived of a certificate already granted to him by the Marine Department may make application to the Marine Department for a certified copy to be issued to him. The applicant must make a declaration before a Stipendiary Magistrate in New Zealand, on form Exn. 17 (obtainable at a Mercantile Marine office), and submit the declaration and such evidence of loss or deprivation as he may be able to furnish, together with a fee of 10s., to a Superintendent of Mercantile Marine for transmission to the Marine Department. The onus of proof of loss or deprivation will rest entirely with the applicant, and he must state the means he has taken to trace and recover the certificate. The fee will be returned to the applicant if he is able to prove the loss of his certificate was caused by shipwreck or by fire.

29. Certificates: Old-pattern may be exchanged for New-pattern.—Any holder of an old-pattern certificate in sheet form may, by making application, and on payment of a fee of 2s. 6d. to a Superintendent of Mercantile Marine, exchange it for a new-pattern certificate in book form. In such cases the old-pattern certificate, which must accompany the application, will be retained by the Marine Department.

FIRST AID TO THE INJURED.

NOTE.—A list of the names and addresses of the local secretaries of the St. John Ambulance Association is given in Appendix C.

30. First Aid to the Injured.—(a) Every candidate for a certificate of any class or grade, other than a master of a river-steamer and a master of a harbour or river sailing-ship, must produce a certificate issued by the St. John Ambulance Association, the St. Andrew's Ambulance Association, the St. Patrick's Ambulance Association, the British Red Cross Society, the London County Council, the Glamorgan County Council, the Leith Nautical College, or other approved body, or by a medical officer of one of His Majesty's ships, to the effect that he has passed examination in first aid to the injured.

(b) The certificate must be an adult certificate—*i.e.*, obtained by the candidate when sixteen years of age or more—and the examination for it must have been passed not more than three years before the date of the examination for the certificate of competency. Certificates issued by the St. John Ambulance Association more than three years before the examination for a certificate of competency will, however, be accepted; provided that, at the expiration of three years since its issue, the certificate has attached to it the "voucher" or "label" of the association certifying that the holder has passed re-examination in first aid.

(c) If a candidate does not possess such a certificate of proficiency in first aid he should apply some time before he wishes to sit for examination for a certificate as master or mate to the local secretary of an approved association or other approved body, who will inform him of the available facilities for the instruction and examination of candidates in first aid.

(d) Besides the courses of instruction which are provided on shore at the ports in the United Kingdom at which examinations for certificates as master and mate are held, courses of instruction given by qualified surgeons on board merchant vessels will be accepted by the St. John Ambulance Association as qualifying the candidate for examination for their certificate of proficiency in first aid, provided the surgeon certifies that he has followed the syllabus of instruction laid down by the association.

(e) The St. Andrew's Ambulance Association will also accept instruction by a ship's surgeon on board ship as qualifying a candidate for examination for their certificates of proficiency in first aid, provided their syllabus is followed. In this case, the candidate must previously have enrolled and obtained an attendance-card, by applying to the local secretary of the association, or to the head office at 98-108, North Street, Glasgow.

(f) It will not be necessary for the candidate for a certificate as master or mate in all cases to produce the formal certificate of proficiency in first aid issued by the associations. In order to prevent delay in proceeding with the examination for the certificate as master or mate and in the issue of the certificates to successful candidates, the special Mercantile Marine linen certificate issued by the St. John Ambulance Association, and duly signed by the lecturer, the surgeon examiner, and the association's local representative, or, in Scotland, a certificate signed by the local examiner of the St. Andrew's Ambulance Association, to the effect that the candidate has passed the examination for a certificate of proficiency, may be accepted as showing that the candidate possesses the required knowledge of first aid.

31. Sight Tests.—(a) Every candidate for a certificate of competency must pass the prescribed sight tests before a certificate can be issued to him. If circumstances render it necessary for him to proceed with the examination in navigation and seamanship before undergoing the sight tests, he should be informed that the examination in navigation and seamanship will be cancelled in the event of his failure to pass either of the sight tests.

Detailed information with regard to the conduct of the examination and the standards required is contained in Appendix G.

(b) **Letter Test.**—Every candidate for a certificate must pass the letter test. If he obtained a certificate of competency before 1st January, 1914, he will only be required to possess half normal vision, using both eyes together. Otherwise he must pass a higher standard—viz., normal vision, using both eyes or either eye separately.

A candidate who fails to pass the letter test may present himself for re-examination at intervals of three months.

(c) **Lantern Test.**—Every candidate must undergo the lantern test on every occasion on which he presents himself for examination for his first certificate of competency; but, if he then passes, he will not be required by the Marine Department to undergo the lantern test on any subsequent occasion.

Any holder of a certificate of competency being a candidate for examination for a certificate of a higher or of a different grade shall not be examined in the lantern test.

A candidate who fails to pass the lantern test shall not be re-examined within the Dominion without authority of the Principal Examiner.

(d) **Special Examination : Referred Cases.**—In some cases it may be necessary for the Examiner, on the instructions of the Principal Examiner, to refer a candidate for special examination at the same or at another port before a decision is given as to his passing or failure in the sight tests. No additional fee will be charged for the special examination in such a case, and the Marine Department will repay at a rate which will be notified to him the travelling-expenses necessarily incurred by the candidate in attending the special examination. A candidate who has been referred for special examination shall not be re-examined by the same Examiner.

(e) **Special Examination : Appeal Cases.**—A candidate who fails to pass the local lantern test may appeal for a special examination in Wellington on payment of a fee of two guineas, which will be returned to him in the event of his passing the special examination. The Marine Department will not make any payment whatever towards the expenses of a candidate who, upon his own application, is examined by the special Examiners, unless the candidate passes the special examination.

(f) When a candidate fails to pass the local lantern test, the Examiner will point out to him the conditions under which he can appeal. Appeals are to be made through the Examiner, and forwarded to the Principal Examiner with the Examiner's remarks.

(g) **Special Examination.**—Candidates who are referred and candidates who on appeal from the result of the local test are granted a special examination are notified by the Principal Examiner of the place and time at which they should attend for special examination, and they shall inform the Principal Examiner whether or not they will be able to attend at that time. Any candidate who, after informing the Principal Examiner that he will attend, fails to appear at the place and time appointed, will be liable to have his examination postponed indefinitely, and also, if an appeal candidate, will forfeit the appeal fee of two guineas, and will be required to deposit a further fee of the same amount before further arrangements can be made for his special examination.

(h) **Failure in Special Examination.**—Where, during the course of a special examination, a candidate is found to have a permanent defect in his eyesight such as to render him unfit for a sea career, he will be finally rejected, and will not be allowed to be examined again in the sight tests on any future occasion. This, however, is subject to the proviso that, if the candidate is still dissatisfied, it will be open to him, if he so desires, to present himself for a second special examination on payment of a fee of six guineas, provided that he brings with him an approved friend to witness the examination. This second special examination will be entirely voluntary, and will form no part of the Marine Department's examination for a certificate of competency, and the Department will not make any payment whatever towards the expenses incurred by such a candidate. However, the Department will give consideration to the result of such examination in determining whether a certificate shall be granted.

(i) **Special Examination : Payment of Expenses.**—In cases in which the Marine Department repay any expenses incurred by a candidate in attending a special examination, the scale and extent of the amount to be repaid will be communicated to the candidate after the time and place at which the special examination has been decided upon and the candidate has signified his agreement to attend.

(j) **Examinations in the Sight Tests only.**—The sight tests are open to all persons serving or intending to serve in the Mercantile Marine or in fishing-vessels, and all such persons are recommended to take the earliest opportunity of ascertaining whether their vision is such as to qualify them for service in that profession. Any such person, if desirous of undergoing the tests, must make application to the Superintendent of a Mercantile Marine office, on the form Exn. 2b, and must pay a fee of 2s. 6d. This fee will be payable on each occasion on which a candidate is examined.

A list of ports at which examinations in the sight tests are held will be found in Appendix B.

CHAPTER II.

QUALIFICATIONS REQUIRED FOR THE VARIOUS GRADES, INCLUDING SYLLABUSES OF EXAMINATION.*

32. Value of Certificates.—Foreign-going certificates of competency as master or mate issued on or after 1st January, 1931, will be valid for use on any mechanically-propelled vessel, but they will not entitle the holders to go to sea as master or mate of a foreign-going sailing-ship unless endorsed for that purpose. Candidates who desire a sailing-ship qualification can obtain the requisite endorsements to their certificates provided that they can comply with the conditions laid down in para. 73 and pass the necessary examination in seamanship. Holders of "Ordinary" certificates issued prior to 1st January, 1931, are entitled to act in their certified capacities in any vessel however propelled.

33. Date of Introduction of Revised Qualifications.—Candidates for certificates of competency who have been examined for and who have failed to obtain a particular grade of certificate prior to 1st January, 1931, may (subject to the provisions of para. 19) be re-examined after that date for the grade of certificate for which they have previously failed without performing any additional sea service. All candidates who undergo their first examination for a particular grade of certificate on or after 1st January, 1931, will be required to qualify under the revised sea service regulations.

On and after 1st January, 1931, candidates for all grades of certificates will be examined in accordance with the revised syllabuses contained in these regulations.

SECOND MATE (FOREIGN-GOING).

34. Qualifications.—A candidate must be not less than twenty years of age, and must have served four years at sea in foreign-going ships or the equivalent, six years, in home-trade ships.

SYLLABUS.

35. General.—Candidates should demonstrate their understanding of their work by means of sketches and figures drawn with reasonable accuracy but not to scale.

The "Knowledge of Principles" paper is intended to test the candidate's grasp of fundamental technical ideas and processes required in his work at sea. Mathematical proofs of formulæ are not required, but a candidate should be able to demonstrate the truth of a formula by means of a figure where possible.

* The sea-service qualifications are shown in tabular form in Appendix I.

36. Paper 1. (Written.)

KNOWLEDGE OF PRINCIPLES. (3 hours.)

- (a) The reading of simple graphical diagrams—*e.g.*, stability curves, weather statistics, &c.
- (b) The practical use of logarithms to base 10; their use in simple calculations involving multiplication, division, simple powers, and roots.
- (c) Areas and perimeters of rectangle, triangle, circle, volumes, and surface areas of box-shaped bodies, cylinders, and wedges. Practical applications—*e.g.*, weight of general cargo of varied shapes; capacities of holds and bunkers; weight of contents of bunkers.
- (d) Plane sections of a sphere. Great and small circles. Angle between two great circles. Shortest distance between two points on a sphere. Formation of spherical triangles. Sides and angles of spherical triangles.
- (e) Trigonometrical ratios—sine, cosine, tangent, cosecant, secant, cotangent; haversine.

The simple relations between these ratios. The relation between the ratios of angles which together make (a) one right angle (b) two right angles—*e.g.*, the sine of an angle = the cosine of its complement, &c.

The solution of a plane right-angled triangle. Use of the Traverse Table for solving right-angled triangles. Practical problems on right-angled triangles—*e.g.*, doubling the angle on the bow, four-point bearing, danger angles, distance from a point of land of known height, &c.

- (f) Given two sides and the included angle of a spherical triangle, to find the third side.

Given three sides of a spherical triangle to find any angle. (These two problems are preferably done by the use of the haversine formulæ.)

A general understanding of the following :—

- (g) The earth and its daily and annual movements. Meaning of equator and poles. The position of a place fixed by its latitude and longitude; meridians. Distances measured on the earth; nautical mile; departure. To show clearly, but without proof, the connection between departure, difference of longitude and middle latitude.
- (h) The real movement of sun, moon, and planets. The celestial sphere; celestial poles; celestial meridian above and below pole; zenith; celestial equator. Altitude and zenith distance of heavenly bodies; celestial horizon; prime vertical; circles of altitude.
- (i) Apparent movements of heavenly bodies. Declination. Rising and setting of heavenly bodies. Amplitude. The position of a heavenly body on the celestial sphere both with and without reference to the observer—*i.e.*, Declination with Right Ascension or Azimuth with altitude. Azimuth.
- (j) Apparent movement of sun. Mean sun. Ecliptic. Length of day and night. First point of Aries. Right ascension. Right Ascension of mean sun.
- (k) General ideas on time. Hour angle. Greenwich and other standard times. Simultaneous hour angles of heavenly bodies in different places. Sidereal time. Relation of longitude and time. Equation of time. Mean and apparent times at Greenwich and elsewhere.
- (l) Hour angle of heavenly body + Right Ascension of heavenly body = Hour Angle of Mean Sun + Right Ascension of Mean Sun.

The meaning of E. and R. in the Nautical Almanac.

- (m) Correction of sextant altitudes. True horizon and visual horizon; dip of the horizon. Effect of atmosphere, refraction. Semidiameter. Parallax.

- (n) Geographical position of heavenly body.

The simple explanation of the "Circle of position" on the earth, based on the three following facts :—

Zenith Distance of heavenly body = distance of geographical position from an observer.

Latitude of geographical position = Declination of heavenly body.

Longitude of geographical position = Hour Angle of heavenly body west of the meridian of Greenwich.

How a position circle is placed on a chart in practice.

Position line. Intercept.

A simple description of how a position line is obtained from the observed Altitude of a heavenly body by :—

- (i) A Meridian Altitude.
- (ii) An Ex-Meridian Altitude.
- (iii) An Altitude of Polaris.
- (iv) An Altitude with an assumed latitude (Longitude by chronometer).
- (v) An Altitude with an assumed Dead Reckoning position (Marcq St. Hilaire).
- (o) Magnetic meridian. Deviation and variation of the magnetic compass. Correction of compass courses and bearings to magnetic or true courses and bearings and *vice versa*.
- (p) The simple properties of a Mercator's Chart with regard to courses and bearings, longitude and latitude scales, and the measurement of distance. Rhumb lines. Meridional Parts.

37. Paper 2. (Written.)

PRACTICAL NAVIGATION I. (Including Tides.) (2 hours.)

- (a) To calculate approximate time of high water by the use of the High Water Full and Change constant. To find the time and height of high and low water at Standard Ports (Admiralty Tide-tables). To find the height of tide at a given time intermediate between high and low water, and thence by use of tables or diagram to determine approximate corrections to soundings and heights of objects above sea-level taken at such intermediate times. Chart datum lines.
- (b) To find course and distance, departure, and difference of latitude between two points by means of the Traverse Table. Practical use of formula connecting departure, difference of longitude and middle latitude.
- (c) To find the course and distance between two points by the use of meridional parts (Mercator Sailing).
- (d) Chronometers. Stowage at safe distance from magnetic and electrical instruments. Management and care. Handling, winding, comparing. Writing up chronometer journal. Value of daily comparisons. Wireless and other time signals for rating chronometers.
- (e) To find true bearing of any heavenly body by Azimuth or Amplitude Tables, diagram, or any other method the candidate may select. To find the error of the compass, and thence the deviation.

38. Paper 3. (Written.)

PRACTICAL NAVIGATION II. (3 hours.)

(In the correction of observed altitudes, total correction tables may be used.)

- (a) By the use of the Traverse Table, to obtain the Dead Reckoning position of the ship at any time, given compass courses and errors, and the run recorded by log or calculated by estimated speed and time by standard clock. The candidate may be asked to allow for the effects of current and wind.
- (b) To find the latitude by Meridian Altitude of sun, star, moon, or planet, and to determine a position line by this means.
- (c) To work an ex-Meridian altitude of the sun, and thence to find a position line.
- (d) To determine from observed altitude of sun, star, moon, or planet a position line on which the ship is by longitude by chronometer method if suitable, or by any other method (*e.g.*, Marcq St. Hilaire) at the discretion of the candidate.
- (e) Given one position line, knowing the speed of ship and interval of time between observations, to transfer such position line to that obtained from meridian or ex-meridian altitude, and thence to determine the ship's position at time of second observation.

39. Paper 4.**CHART WORK.** (2 hours.)

(True courses and bearing will, as a rule, be given as from a Compass Card marked 0° to 360°—e.g., course 264° True. Magnetic and compass courses and bearings will be given with reference to cardinal points—e.g., course S. 84° W. magnetic. Candidates should conform to this practice.)

- (a) On a chart, to find the true course and distance between two points; given compass error, to find magnetic and compass course and *vice versa*; to keep the Dead Reckoning on a chart; to lay off courses, allowing for current.
 - (b) On a chart, to fix the ship by simultaneous cross bearings, bearing and range, or by wireless cross bearings, applying the necessary corrections. To fix by the bearings of one or more objects with run between, allowing for current; to find the distance at which the ship will pass a given point.
 - (c) To avoid dangers and to use clearing marks. To use horizontal and vertical danger angles.
 - (d) To interpret from a chart the information it gives, particularly about buoys, lights, depths and nature of bottom, tides, and tidal currents. Recognition of the coast. The intelligent use of Sailing Directions.
- (N.B.—The Examiner may ask oral questions on the above syllabus.)

40. Paper 5. (Written.)**CARGO WORK AND ELEMENTARY SHIP CONSTRUCTION.** (3 hours.)

- (a) The stowage and dunnaging of different varieties of cargoes, including bulk cargoes. Elementary ideas on the making and use of cargo plans.
 - The preparation for stowage, breaking out and discharge of cargo.
 - Rigging a ship for loading and discharging cargo, and the use of derricks and winches. Strength of cargo gear.
 - The calculation of capacities of bunkers, holds, tanks, and boats.
 - Calculation of capacities taken up by part cargoes and of space remaining. Conversion of weight measurement of cargo into space measurement and *vice versa*.
- (b) The names of the principal parts of a ship.
 - General ideas on ship construction and hull maintenance. The candidate will be expected to show his practical acquaintance with certain portions of his own ship—e.g., longitudinal and transverse framing. Bulkheads. Hatches. Rudders and steering gear. Shell plating. Stern frame. Propellers and propeller shafts, stern tube, propeller brackets.
 - The stiffening and strengthening to resist panting, pounding, and propeller vibrations.
 - Double-bottom tanks, bilges, bilge-pumps, sounding-pipes. Ventilation systems of holds and tanks.
- (c) Displacement. Deadweight.
 - Use of tons per inch immersion scale. Calculation of weight of cargo, &c., from draughts.
 - Effect of varying density of water.
 - Buoyancy. Centre of gravity and centre of buoyancy. The laws of floating bodies.
 - Effect of filling and emptying ballast-tanks on centre of gravity of ship as a whole.

41. Paper 6. (Written.)**ENGLISH.** (1½ hours.)

(The paper will be designed to test the candidate's ability to write clear and grammatical English with due attention to spelling and penmanship. It will be in no sense a test of technical knowledge.)

42. Oral and Practical Portions.

1. (a) Rigging of ships. Strength of ropes, wire, and hemp. Rigging purchases of various kinds, and knowledge of power gained by purchases. Knotting and splicing hemp and steel ropes with strict reference to current practice. Seizings, racking chain stoppers, &c.
- (b) Sending topmasts up and down.

(c) Bending, setting, and taking in fore and aft sails. Management of boats under oars and sail and in heavy weather. Beaching or landing. Coming alongside.

(d) Helm orders. Conning the ship.

2. (a) Marking and use of ordinary lead-line.

(b) Use and upkeep of mechanical logs and sounding-machines.

(c) Use and upkeep of engine-room and other telegraphs.

(d) Rocket and line throwing apparatus.

3. (a) Anchors and cables. Use, upkeep, and survey.

(b) knowledge of use and maintenance of deck appliances and steering-gear.

(c) Fire - extinguishing apparatus — steam, chemical, and other appliances.

4. (a) Preparations and precautions for getting under way. Duties prior to proceeding to sea, making harbour, or coming alongside, especially at after end of ship.

(b) Keeping an anchor watch. Dragging anchor.

(c) Duties of officer of the watch. Use of compass to ascertain risk of collision.

5. (a) A full knowledge of the content and application of the regulations for preventing collision at sea. (Candidates will not be placed in the position of handling a sailing-ship, but will be expected to recognize a sailing-ship's lights, and to have a knowledge of her possible manœuvres according to the direction of the wind.)

(b) Distress and pilot signals; penalties for misuse.

(c) British uniform system of buoyage.

(d) An intelligent use of "Notices to Mariners." (Candidates will not be required to commit these to memory.)

6. *Signals.*

To send and receive signals in—

(a) British Semaphore up to eight words per minute.

(b) Morse Code by flash-lamp up to six words per minute.

(c) International Code of Signals.

7. *Practical.*

(a) To read and understand a barometer, thermometer, hydrometer, and hygrometer. (The instruments supplied by the Meteorological Office will be taken as standard.)

(b) To use an azimuth mirror, pelorus (bearing plate), or other instrument for taking bearings; to place these bearings on a chart, having corrected for given compass error.

(c) To use a sextant for taking vertical and horizontal angles; to read a sextant both on and off the arc.

(d) To correct a sextant into which has been introduced some or all of perpendicularity, side and index errors.

(e) To find the index error of a given sextant.

(f) To check chronometers by signal made by buzzer or other method; to compare two chronometers.

8. The Examiner may ask the candidate questions arising out of the written work, if he deems it necessary on account of weakness shown by the candidate. (This applies particularly to Paper 5.)

FIRST MATE (FOREIGN-GOING).

43. **Qualifications.***—A candidate must not be less than twenty-one and a half years of age, and must have served five and a half years at sea in foreign-going ships or the equivalent, eight years and three months, in home trade ships (*see paras. 112 and 113*). This period of sea service must include *either*

(a) Eighteen months in a capacity not lower than that of third of three watchkeeping officers on a foreign-going ship whilst holding a certificate as second mate of a foreign-going ship (*see also para. 116*); *or*

(b) Two years and three months in a capacity not lower than that of first or only mate of a home trade ship whilst holding a certificate as second mate of a foreign-going ship (*see also para. 112 for conditions under which service as second mate of a home-trade ship may be accepted*).

* For convenience of calculation the service required is stated in a tabular form to in Appendix I.

44. First Mate, Special Regulations applying only where a Candidate has served continuously with the same Company as Apprentice and Junior Officer.—A candidate who has served continuously with the same company or shipping firm as apprentice and junior officer may be allowed to present himself for examination for a certificate as first mate on completion of two years' service, performed while holding a second mate's certificate, as the junior of two bridge-keeping officers of the watch, provided that the whole of this service has been performed upon ocean-going steamships of not less than 8,000 tons gross, making an average speed of 15 knots or upwards, and carrying a crew of not less than 130 men, including at least five deck officers in addition to the master. If the candidate passes the examination a certificate will not be issued to him, however, until he produces proof of twelve months' sea service in effective charge of a watch (*see para. 116*) in addition to the two years' service as junior bridge-keeping officer described above.

SYLLABUS.

(The Navigation and chartwork papers may include questions on the syllabus for second mate.)

45. Paper 1. (Written.)

PRACTICAL NAVIGATION I. (3 hours.)

- (a) Knowledge and recognition of stars of first magnitude. To calculate the approximate times (to nearest minute) of meridian passage of any heavenly bodies; to calculate an approximate altitude for setting the sextant for a meridian altitude of a heavenly body.
- (b) To find the latitude from an altitude of Polaris. Thence to find a position line.
- (c) To work a ex-meridian altitude of any heavenly body and thence to find a position line.
- (d) By transfer of a previous position line and an observation of a heavenly body, to obtain a running fix by the use of protractor and plain or squared paper, or by tables. Particular cases of position lines from Meridian Altitudes or from Polaris.
- (e) By nearly simultaneous altitudes of any heavenly body, to determine the position at the time of observation from the intersection of position lines.

46. Paper 2. (Written.)

PRACTICAL NAVIGATION II. (2 hours.)

- (a) To find the magnetic bearing of a distant object by swinging on equidistant compass points, thence to construct a deviation table or curve.
- (b) To calculate the initial course and distance on a Great Circle track between two points, and, by the use of the Vertex of the Great Circle, to lay off such a track on a Mercator's Chart.
- (c) The use of Admiralty Tide Tables (Part II, Section 1, the use of non-harmonic constants and tidal differences).
- (d) The harmonic method of tidal prediction and the use of harmonic constants (Admiralty Tide-tables, Part II, Section II).

47. Paper 3.

CHART WORK. (2 hours.)

- (a) To interpret from a chart the information it gives and to use Sailing Directions intelligently. Description and recognition of a coast. Landfalls in clear weather. Selection of suitable points for bearings. Distance of sighting lights; distance from point of land of known height; distance of passing a point of land; course to pass a point at a given distance. Danger angles—horizontal and vertical. Entering channels allowing for current. To prepare for anchorage and for entering narrow waters. Reliability of charts. Corrections.

- (b) Landfalls in thick weather. Construction and use of line of soundings. The general use of a single position line in making land, including clearing marks. The use of bearings obtained by wireless direction finder, bearings given from shore station, or the use of wireless beacons.
- (c) The use of a Gnomonic Chart and transfer of a Great Circle or composite track from such a chart to Mercator's Chart.
(N.B.—The Examiner may ask oral questions on the above syllabus.)

48. Paper 4. (Written.)

SHIP CONSTRUCTION AND STABILITY. (3 hours.)

- (a) A general knowledge of the principal structural members of a ship. Midship sections of different types of ships, giving the parts their proper names. Scaling dimensions on a midship section to make intelligible reports.
Ability to set out in a clear manner a report on damage sustained by corrosion or by accident.
Construction and stiffening of watertight bulkheads.
Collision bulkhead.
Stern frame and stem and how secured.
Stresses and strains in ships through effect of seas or loading and ballasting.
A knowledge of those portions of a ship specially strengthened to withstand such stresses, or where excessive damage by corrosion is liable to occur.
Rivets and riveting. Testing a line of rivets. Testing watertight work.
Rudders and steering gear. Inspection and maintenance.
Hatches and hatch gear. Hawsepipes and cable lockers.
- (b) Buoyancy and reserve buoyancy. The righting couple when a ship is inclined. Metacentre and metacentric height. Transverse and longitudinal metacentres. Stiff and tender ships—how to obtain stiffness. Stability at large angles of inclination and what this depends on.
Preparation of data for ascertaining metacentric heights of a ship in any particular condition.
Determination of centre of gravity of a ship in any condition, the centre of gravity in light condition being given. Use of stability curves and data supplied to a ship. Alteration of stability during a voyage. Effect of shifting cargo. Change of trim.

49. Paper 5. (Written.)

SHIP MAINTENANCE, ROUTINE AND CARGO WORK. (3 hours.)

- (a) Keeping a ship's log. (Mate's log.)
- (b) Ship maintenance and organization. Indents and stores. Repair lists. Properties and uses of paints. Painting. Chipping, scraping. Cement work. Treatment of wood work. Inspection and maintenance of bulkheads, double bottoms, deep tanks, rudders. Bottom painting. Drainage of holds and double bottom tanks. Inspection and maintenance of anchors and cables. Maintenance of holds with reference to cargo carrying. Spar ceilings, &c. Inspection and maintenance of pumps, strums, roseboxes, and bilges.
- (c) Simple calculation of stresses in spans, derricks, topping lifts, &c. Strength of ropes, chains, slings, two slings at an angle, &c. Purchases and power gained by purchases.
- (d) *Cargo work.*—(The candidate should, where possible, illustrate his answers from his own experience.)
Stowage of cargo. General—stowage of bag cargoes, bales, casks, &c.
Bulk stowage. Partition and shifting boards. Ceilings and dunnage. Deck stowage. Possible damage and its avoidance.
Good and bad stowage. Special cargoes—explosives, grain, timber, oil in bulk, steel rails, &c.
Given a cargo list, to stow a hold or holds, making a rough cargo plan, with a view to stability of tender and stiff ships, damage and contamination, easy handling and possible optional ports of discharge.
Methods of ventilation of cargoes. Drainage of holds.
Closing of hatches. Cargo working gear—derricks and winches. Organization of cargo work.

METEOROLOGY. (2 hours.)

50. Paper 6. (Written.)

- (a) The principles of the barometer. How to read it and reduce the readings to standard datum.
- (b) How to observe the force and direction of the wind with no other instrument than the compass and use of the Beaufort scale.
- (c) How to observe and log the state of sea and swell, weather, and visibility by the international scales for the use of seamen.
- (d) The principles and use of the thermometer, dry bulb, wet bulb, and sea surface.
- (e) Use of hydrometer.
- (f) General knowledge of the wind and current systems of the oceans. How to deduce the set and drift of currents.
- (g) The Laws of Storms. Buys' Ballot's Law. Rules for handling ships in tropical revolving storms. The seasons and localities of tropical revolving storms and their precursory signs.
- (h) The Visual Storm Warning signals.
- (i) The seven fundamental types of weather.
- (j) The elementary principles of synoptic charts, including a knowledge of how the atmospheric pressure distribution and gradient is obtained. Principal cloud types.
- (k) To draft a wireless weather report and how to decode a weather report made in the International Weather Code, the tables being provided.

51. Oral Portion.

1. (a) Shifting large spars and rigging sheers.
- (b) The handling of heavy weights with special reference to strength of gear used.
- (c) Use and maintenance of all deck and above deck appliances and fittings—winches, capstans, windlasses, emergency steering-gear, and fittings used between anchor and cable locker. Hoisting in boats.
- (d) Bending, setting, and taking in fore and aft sails. Management and equipment of ships' lifeboats and number of persons who may be carried in each class of boat.
2. Anchors—different kinds; advantages and disadvantages of each. How to rig a sea anchor and what means to employ to keep a vessel, disabled or unmanageable, out of the trough of the sea and lessen her lee drift. Cables and their care. Preparations for anchoring. Operation of anchoring with single anchor and use of second anchor. Clearing a foul anchor. Mooring. Clearing a foul hawse. Anchoring in a tideway and in a confined space. Dragging anchor. Anchor watch. Slipping a cable. To carry out an anchor with boats. Getting under way.
3. (a) Effect of propellers on the steering of a ship. Stopping, going astern, and manœuvring. Turning circles. Effects of current, wind, sea, shallows, draft.
- (b) Coming alongside a wharf, &c. Turning a steamship short round, manœuvring in rivers and harbours. Emergency manœuvres. Man overboard.
- (c) Management of steamships in stormy weather.
- (d) To get a cast of the deep-sea lead.
4. (a) Testing lifebuoys and life jackets; other life-saving gear.
- (b) Accidents—*e.g.*, collision, running aground, accidents to hatches, leaks, fires, and their treatment. Running repairs. Handling a disabled ship.
- (c) A practical knowledge of the screening of ships' navigation lights.
- (d) Preparation for dry-docking. Use of shores, bilge blocks and bilge shores.
5. Regulations for prevention of collision at sea—as para. 42, Section 5 (Oral) Second Mate.
6. Signals.—As para. 42, Section 6 (Oral), Second Mate.
7. The Examiner may ask the candidate questions arising out of the written work, if he deems it necessary on account of weakness shown by the candidate.

MASTER FOREIGN-GOING.

52. Qualifications.*—A candidate must not be less than twenty-three years of age, and must have served seven years at sea in foreign-going ships or the equivalent, ten and a half years, in home-trade ships (*see* paras. 112 and 113). This period of service must include *either*—

- (a) One year and six months in a capacity not lower than first mate of a foreign-going ship whilst holding a certificate of grade not lower than that of first mate of a foreign-going ship (*see* para. 115); *or*
- (b) Two years and three months in a capacity not lower than that of first or only mate of a home-trade ship whilst holding a certificate of grade not lower than that of first mate of a foreign-going ship; *or*
- (c) Two years in a capacity not lower than that of second of three watchkeeping officers, on a foreign-going ship whilst holding a certificate as first mate of a foreign-going ship; *or*
- (d) Two years and six months in a capacity not lower than third of three watchkeeping officers on a foreign-going ship, whilst holding a certificate of grade not lower than that of first mate of a foreign-going ship; *or*
- (e) Three years as master of a home-trade ship: during at least one year of this service he must have held a certificate of grade not lower than that of second mate of a foreign-going ship or master of a home-trade ship.

A candidate who possesses or is entitled to a Certificate of Service as Master (under para. 16) may be examined for a certificate of competency without producing any evidence of sea service.

For interpretation of watchkeeping service for the purposes of these regulations, *see* para. 116.

SYLLABUS.**53. Paper 1.** (Written.)**PRACTICAL NAVIGATION.** (3 hours.)

A short recapitulation paper in navigation on the syllabus for second mate and first mate, which should include chart work.

54. Paper 2. (Written.)**METEOROLOGY.** (2 hours.)

Ocean pilotage—*i.e.*, general knowledge of winds and currents, and the selection of routes according to season. Icebergs, ice signals, and ice navigation.

To be able to plot observation of ships and coast stations, received by wireless, and to construct a simple weather chart. To understand the use of the observation of the change of the barometer by single and collective observations; and to make deductions as to probable changes of weather along the proposed track of his ship.

A general knowledge of the system of wireless weather signals (*when* one international system is brought about):

55. Paper 3. (Written.)**SHIP CONSTRUCTION AND STABILITY.** (3 hours.)

- (a) The direction of simple ship repairs. Drawing up of simple specifications.
- (b) A fuller knowledge of ship construction than in previous examinations. General structure—transverse and longitudinal girders; keels; stern frame, stem and rudder post; centre keelson; bilge and side keelsons; side stringers; tank margin, intercostals; transverse framing; shell plating; rudder propeller brackets, masts and derricks.
Classification of ships. Tonnage—measurement and registration. Freeboard.
Treatment of accidents and damage—collision, springing leaks.
Possible strains incurred by action of waves, improper loading or ballasting, &c.
Working of ship, division of loads.

* For convenience of calculation the service required is stated in a tabular form in Appendix I.

- (c) Stability diagrams and use of stability curves and information. Effect of beam and freeboard on stability. Practical operations to ensure ship stability at sea. Ship with a list. Management of ballast tanks. Effect of free liquid surfaces and risks of flooding hold spaces, filling and emptying tanks at sea. Suspended weights and shifting cargoes. Deck cargoes. Homogeneous cargoes. Ballasting. Effect of admission of water into interior of a ship. Flooded compartments. Stability and trim of a stranded ship. Trim—moment to change trim.

56. Paper 4. (Written.)

ENGLISH. (2 hours.)

This paper will test and candidate's ability to write clear and grammatical English, with good spelling and penmanship. It will be in no sense a test of technical or legal knowledge.

57. Paper 5. (Written.)

SHIP'S BUSINESS. (2 hours.)

(The legal information required will not go beyond the outline of mercantile law which the shipmaster must know for practical purposes.)

- (a) The official log and reports on exceptional entries.
 (b) A shipmaster's knowledge of the law relating to:—
- (1) Engagement, discharge, and management of a ship's crew. Ship's articles of agreement. Discipline and treatment of offences. Wages and other remuneration. Food and accommodation. Entering and clearing the ship. National insurance of crew.
 - (2) Tonnage, life-saving appliances, salvage and assistance and, in general, the safety of ship, crew, and passengers.
 - (3) Loadline marks and entries and reports to be made respecting them. Surveys required by law.
 - (4) Hygiene of ships, living spaces, holds, &c. Water. Fresh and preserved food. Infectious diseases. The law relating to them and the procedure on board in such case. Quarantine procedure. Recognition and simple treatment of common illness—*e.g.*, fevers, &c. [See the Ship Captain's Medical Guide].
 - (5) The carriage of emigrants.
- (c) A simple knowledge of the law relating to cargo, including a knowledge of shipowners' liabilities in carriage of cargo.
 (d) A general knowledge of shipping business and documents—charter parties, bills of lading, &c. A knowledge of averages—general and particular. Flotsam and jetsam.

58. Paper 6. (Written.)

MAGNETIC COMPASS. (2 hours.)

(Proofs of formulæ not required.)

- (a) Terrestrial magnetism: Variation. Local attraction. Horizontal force and its varying strength in different parts of the globe with the effect of its change upon deviation.
 (b) Properties of magnets: Meaning of the terms "Hard" and "Soft" Iron. Effect of magnets on a compass needle under varying conditions. Precautions with regard to electric lighting loads and other electric fields. Sub-permanent magnetism and its effects at sea.
 (c) Compass compensation: Methods of swinging ship to obtain a deviation table. Use of curves of deviation. Constant semi-circular and quadrantal deviation. To analyse a table of deviation, obtaining and explaining the approximate co-efficients, A, B, C, D, E. General principle of compass correction, and the method of correction of B, C, and D.
 (d) Heeling error: The nature of the deviation caused and the effect on a ship with a list and when rolling. Method of correction.
 (e) A candidate may be required, at some stage in the examination, to carry out certain practical operations of correction on a compass in a binnacle, and/or to construct a deviation table for that compass.

59. Paper 7. (Written.)

ENGINEERING KNOWLEDGE (including carriage of refrigerated cargoes).
(3 hours.)

(The requirements will not go beyond the knowledge that could be obtained by a deck officer who takes an intelligent interest in the machinery of the ship and supplements by a little reading what he has learnt in this way.)

- (a) The meaning of general engineering terms—*e.g.*, horse-power, slip and pitch of propeller, link, latent heat of steam superheated steam, &c.

A general knowledge of a marine boiler and furnaces and the procedure for raising steam. The general action of a reciprocating steam-engine. Principle of the condenser. Distribution of steam from boiler to engines—valves and pipelines. Admission to engine—slide valves, eccentrics, expansion link. Starting-gear. Simple description (without detail) of various parts of engines and boilers—*e.g.*, connecting-rod, crank, piston and rings, packing of piston rods, relief valves and cylinder drains, line shafting, couplings, tail shaft, stern tube and packing. Auxiliaries and their uses—circulating pump, air pump, feed pump, bilge pump. Action of propeller. Thrust block. Attachment of propeller to shaft.

Oil-fired furnaces and use of oil fuel. A simple knowledge of turbine machinery and of Diesel engines. Warming up and turning engines. Stopping and going astern—how done. A knowledge of what is required in the engine room on the receipt of manœuvring orders from the bridge. Fuel consumption and economical speeds. Power and speed curves. Effect of alterations of speed on fuel consumption and estimation of adequacy of fuel to complete a given voyage.

- (b) An elementary knowledge of refrigeration on board ship. Types of refrigeration on board ships. Types of refrigeration employed in special cases. Stowage and general handling of refrigerated cargoes.

60. Oral Portion.

1. (a) Exceptional circumstances—loss of rudder; shifting a damaged rudder. Construction of jury rudders. Making and launching of rafts. Collision. Leaks. Damage of all kinds. Running repairs and precautions in case of accidents. Grounding—methods of refloating. Beaching a vessel. Steps to be taken when disabled and in distress.
 - (b) Preservation of crew and passengers in the event of wreck. Abandoning a wrecked ship. Rockets and rocket apparatus. Communications with the shore.
 - (c) Assisting a vessel in distress. Rescuing crew of a disabled ship.
 - (d) Towing and being towed.
 - (e) Bad weather manœuvres. Precautions at anchor and at sea. Use of oil. Anchoring and working anchors and cables in all circumstances. Approaching rivers and harbours and manœuvring in them.
 - (f) Drydocking. General procedure and precautions to be observed. Distribution of weight. Drydocking with full cargo for inspection of propellers or shafting. Bilge beds. Leaving the vessel water borne. Putting into port with damage to ship and/or cargo, both from business and technical points of view. Safeguarding of cargo.
 - (g) Prevention of fire at sea. Spontaneous combustion of fuel cargoes. Full knowledge of the use of fire-extinguishing appliance and precautions to be observed in cases of danger to life. Special reference to extinguishing of oil-fuel fires.
 - (h) Methods of fumigating holds and living spaces and safeguards in applying them.
 - (i) General organization of ship's work and handling of crew.
2. Regulations for prevention of collisions at sea, &c.—As para. 42, Section 5. (Oral) Second Mate.
 3. Signals.—As para. 42, Section 6 (Oral) Second Mate.
 4. The Examiner may ask the candidate questions arising out of the written work if he deems it necessary on account of weakness shown by the candidate.

EXTRA MASTER (FOREIGN-GOING).

61. Qualifications.—The examination for an extra master's certificate is voluntary, and intended for such persons as wish to prove their superior qualifications and are desirous of having certificates of the highest grade granted by the Marine Department. The certificate will entitle the holder to go to sea as master of any mechanically-propelled vessel. There is no certificate or endorsement as extra master, sailing-ships, but a candidate for extra master who wishes to be qualified to act as master of sailing-ships may, provided that he has performed the necessary sea service in sailing-ships, be examined at the same time for a sailing-ship endorsement as master.

The extra examination may take place when the candidate is qualified to go up for examination for a master's foreign-going certificate, or at any time subsequent to his having passed the examination for that certificate.

SYLLABUS.**62. General.**

The mathematical and scientific knowledge required from candidates is such as to enable them to have a thorough understanding of their technical subjects.

Candidates will be examined orally in seamanship. Their orals will also include a *viva voce* on the syllabuses of their written papers, and will give them an opportunity to improve the marks made in them (*see* para. 72).

MATHEMATICS. (3 hours.)**63. Paper 1.**

(a) Mensuration and Drawing. (Proofs not required.)

Areas, perimeters, and general properties of triangles, parallelograms, polygons, circles, segments, and sectors of circles. Areas of irregular figures and waterplanes. Volumes and surface areas of parallelepipeds, cones, cylinders, spheres, wedges, and ship-shaped bodies. Simple drawing in plan and elevation (*i.e.*, elements of solid geometrical drawing). Reading of simple engineering and shipbuilding drawings.

(b) Algebra.—The evaluation of formulæ. The solution of equations of the first degree with one or two variables; quadratics; problems involving these. Powers and indices. Logarithms and their properties. Arithmetical and geometrical progressions. Simple graphical methods, including graphical solution of equations. Use of curves.

(c) Geometry.—A knowledge of the substance of the geometrical properties of the following so far as they are dealt with in the propositions of Euclid indicated:—

Straight lines	Bk. I.	13, 14, 15.
Parallel Straight lines	Bk. I.	27, 28, 29, 30.
Properties of angles of triangles	Bk. I.	32 (and cor.).
Congruence of triangles and properties of triangles	Bk. I.	4, 8, 26, 5, 6.
Parallelograms	Bk. I.	33, 34.
Areas	Bk. I.	35-41 and 43.
Relation between squares on sides of right-angled triangle	Bk. I.	47.
Notions on loci.		
Geometry of Circle:—		
Chords	Bk. III.	3, 14, 15.
Properties of angles in a circle	Bk. III.	20, 21, 22, 31, 33, 26-29.
Tangent properties	Bk. III.	16, 18, 19.

Practical Geometry:—

- Bisection of angles and straight lines.
- Construction of perpendiculars to straight lines.
- Drawing of parallels to given straight line.
- Construction of triangles and quadrilaterals from given data.
- Division of straight lines into any number of equal parts.
- Construction of circle through three points or circumscribing a triangle.
- Construction of tangents to a circle at a given point or from an external point.
- Construction of common tangent to two circles.
- Construction of circle touching the three sides of a given triangle.
- Construction of circles from sufficient data.
- Construction of segment of circle containing a given angle.
- Elementary ideas on solid geometry — *e.g.*, angle between planes, angle between line and plane, geometry of the sphere.

(d) Trigonometry.

(i) Plane.

Measurement of angles, circular measure and its applications. Solution of plane triangles.

Graphs of trigonometrical functions.

Formulae for trigonometrical ratios of sum and difference of two angles.

Trigonometrical functions of $A/2$ given those of A . Haversines.

Transformation of formulae for logarithmic calculation.

For small angles, $\sin x = x \sin 1''$. Construction of tables.

(ii) Spherical.

General ideas on the sphere and spherical triangles.

The fundamental formulae for the solution of a spherical triangle.

i.e., $\cos a = \cos b \cos c + \sin b \sin c \cos A$ and

$$\frac{\sin a}{\sin A} = \frac{\sin b}{\sin B} = \frac{\sin c}{\sin C}.$$

Conversion for logarithmic computation by the use of the haversines—*i.e.*, $\text{hav } a = \text{hav } (b \sim c) + \frac{\sin b \sin c \text{ hav } A}{\text{hav } (a - b \sim c) \text{ hav } (a + b \sim c)}$.
and $\text{hav } A = \text{cosec } b \text{ cosec } c \sqrt{\text{hav } (a - b \sim c) \text{ hav } (a + b \sim c)}$.
Solution of right-angled spherical triangles and quadrantal triangles.

64. Paper 2.

GENERAL SCIENCE. (3 hours.)

(a) Mechanics.

- (i) Velocity; acceleration; uniform motion in a straight line. Composition and resolution of velocities and accelerations. Relative velocity. Currents and apparent wind. The laws of motion. Mass. Force. Weight. Inertia. Momentum. Relation between force, time, and momentum; relation between force, mass, and acceleration. Conservation of momentum. Motion under gravitational forces. Work. Energy—Kinetic and potential. Conservation of energy. Rate of doing work. Horse-power. Use of fly-wheels. Uniform circular motion. Angular velocity. Simple harmonic motion. Pendulums. Connecting rods and cranks.

- (ii) Force and its graphical representation. Composition and resolution of forces. Parallel forces. Equilibrium of a rigid body in two dimensions.

Centre of gravity.

Theorem of moments. Couples. Bending moments and shearing forces. Work done by a force. Graphical representation. Transmission of work. Friction and its laws. Simple machines—Levers, inclined plane, wheel and axle, capstan. Pulleys—simple and differential.

(b) Hydrostatics.

Pressure of fluids. Principle of Archimedes. Density and Specific Gravity. Hydrometers. Displacement of a ship. Laws of equilibrium of floating bodies. Buoyancy. Centre of buoyancy. Centres of pressure. Hydraulic machines—presses and pumps.

Gases—Boyle's Law. Atmospheric pressure. Barometer. Sounding tubes. Pressure gauges and manometers.

(c) Heat.

Temperature and its measurement. Expansion of solids, liquids, and gases. Applications, Maximum density of water. Specific heat. Change of state—fusion and solidification. Latent heat. Vaporization and condensation. Hygrometry. Conduction, convection, and radiation of heat.

(d) Light.

Shadows and eclipses. Reflection—plane, mirrors. Refraction. Prisms and lenses. Telescopes. Sextant and errors. Other optical instruments used at sea.

(e) Sound.

Production and propagation of sound. Transmission and velocity. Reflection and refraction of sound. Effects of temperature and wind on transmission of sound waves.

65. Paper 3.**NAVIGATION. (3 hours.)**

A comprehensive knowledge of modern navigational methods and facility in their use, together with—

Determination of error of chronometer by the use of an artificial or natural horizon. Proofs of methods and formulæ in use in modern navigational practice. Comparison of different methods of determining observer's position. Equivalent of position lines determined by any recognized method. True position from several observations. The "cocked hat" and the limited area, most probable position. True position when errors occur in estimated position. Altitudes or time. Selection of heavenly bodies for observations. Selection of objects for fixes. Good and bad fixes. Various methods of fixing ship. Accuracy and limitations. Most favourable conditions. Theory of sextant and vernier. Errors of collimation and parallelism. Description and use of all apparatus to safeguard navigation in the open sea and coastwise—*e.g.*, sounding-machines, including sonic sounding gear, wireless navigational instruments and methods, &c. Theory of tides. Tidal tables and their use, including the harmonic method of prediction. Tidal streams. Abnormal tides. The behaviour of a freely mounted gyroscope and effect of suspension. Precession. The earth's rotation and its influence on a gyroscope. Principles of the gyro compass. Damping. Course and speed errors. Ballistic deflection.

66. Paper 4.**CHART WORK. (2 hours.)**

A complete knowledge of charts and information given by a chart. All methods of fixing ship by observations of terrestrial objects and a combination of observations on celestial and terrestrial objects. The principles of navigation in pilotage waters and avoidance of danger, both in clear weather and fog. The laying-off of great circle and composite tracks on Gnomonic and Mercator's charts and the use of Great Circle tables.

67. Paper 5.**CHART-CONSTRUCTION AND MARINE SURVEYING. (3 hours.)**

The theory and construction of charts on Mercator's principle. Candidates may be asked to construct and use such a chart. The principles of the construction of a Gnomonic chart (without proof) and the special case of Polar charts. Candidates will *not* be asked to construct such a chart.

Elementary hydrographic surveying. Charting on an existing chart of objects useful for navigation. Scale-making and the laying-off of angles. Methods of fixing position. Method of running lines of soundings.

68. Paper 6.**MAGNETISM AND ELECTRICITY, INCLUDING THE MAGNETIC COMPASS. (3 hours.)**

Electric currents and their production. Simple cells. Electromotive force, resistance and current. Ohm's Law. Polarization. Magnetic fields and lines of force. Induced magnetism. Hard and soft iron. The magnetic field of conductors. Carrying current. Solenoids and electro-magnets. Terrestrial magnetism. Horizontal force, vertical force, and dip. The effect of magnetic fields of all descriptions on the compass needle. Elementary principles of dynamos and motors. Application to winches. Electric lighting and arc lights.

A fuller knowledge of the syllabus in Compass Correction for Master, with, in addition, the correction of coefficient E. The components of the permanent magnetism of the ship, P, Q, and R; the soft iron rods, a, c, e, and k. The relation severally of these components and rods to the various coefficients and to heeling error.

Swinging ship. Construction of deviation tables by bearings of a distant object, reciprocal bearings and azimuths of a heavenly body. Practical analysis of a deviation table and practical compass correction.

69. Paper 7.**CONSTRUCTION, WORKING, AND UPKEEP OF SHIPS. (3 hours.)**

Classification of ships. Registration societies. Displacements. Weight of hull. Capacity. Draught. Freeboard. Block coefficient. Gross deadweight and net tonnage. The interpretation of plans. Principal structural members. Longitudinal and transverse framing. Scantlings. Reverse frames. Beams. Cellular double bottoms, &c. Watertight subdivision, water-ballast arrangements. Elements of structure—*e.g.*, keels, decks, bulkheads, shell-plating, rivets and riveting, hatches, &c. Types of ship. Tonnage rules, &c. Consideration of construction—weight, fittings. Shipyard practice. Laying off. Mould loft. Scribe board, launching, &c. Materials of construction and their properties. Steel and iron. Notions of strains and stresses in metals—tension, torsion, compression, bending, and shearing. Stresses and strain in ships.

Stability. The theory and calculations involved in a determination of the stability of a vessel in light and loaded condition. Experimental determination of stability of a ship. Use of stability curves and information. Dynamic stability—rolling, &c. Ballasting, loading. Effect of admission of water into interior of a ship. Trim.

70. Paper 8.**COMMERCIAL AND LEGAL KNOWLEDGE. (2 hours.)**

- (a) A shipmaster's knowledge of the Merchant Shipping Acts relating to registry, masters and seamen, safety of ships, delivery of goods, liability of shipowners, wreck and salvage, pilotage and emigrants.
- (b) A shipmaster's knowledge of the general management of ship's business, documents and procedure with Customs, &c., obligations and liabilities of owner and master with respect to passengers, cargo, and ship. Charter parties and expenses involved (various kinds). Demurrage, claims, &c.
- (c) Port machinery—use of quays. Sheds, warehouses, docks, and waterside termini. Administration and working of ports. Cranes and their use—steam, hydraulic, floating, movable. Coaling apparatus. Mineral and grain elevators. Graving docks. Floating docks.

71. Paper 9.**OCEANOGRAPHY AND ECONOMIC GEOGRAPHY. (3 hours.)**

A fuller knowledge of meteorology and meteorological instruments than that required for master. Winds, current ice limits, &c., for the globe. General characters of the seas—depths, surface temperatures, surface densities. Oceanic circulation. Floating ice.

Principal world products and sources of supply: Mineral—*e.g.*, coal, ores, stones, oils and their products. Vegetable—*e.g.*, cereals, fruit, textile plants, forests for wood, gums, and rubber. Coffee, tea, sugar, spices, &c. Animal-food, chilled and frozen meats and fish. Comparative knowledge of imports and exports, tonnage, movements of ships, port activities. Main routes of communication. Freight variations and their causes.

72. Oral.—The candidate will be examined in the seaman-ship syllabus laid down for a master's foreign-going certificate (*see* para. 60), and he will be expected to reach a higher standard in his answers than a candidate for a master's certificate.

The candidate will also be examined orally on the syllabuses for his written work, and questions will be so designed as to allow the candidate, where desirable, to amplify his written work.

73. Sailing-ship Endorsements.—A candidate for a sailing-ship endorsement of any grade who has not previously held an endorsement of a lower grade or an Ordinary certificate of a lower grade issued prior to January, 1931, must prove that he has served twelve months in the foreign trade or eighteen months in the home trade, in a square-rigged sailing vessel. Service in vessels with auxiliary steam or motor power, which use their propelling machinery only in calms or during light winds, is considered as service performed in sailing-vessels. Amongst square-rigged vessels are classed full-rigged ships, barques, brigs, barquentines, and brigantines.

Subject to the above qualification, a candidate may be examined for a sailing-ship endorsement of any grade at the same time as he is examined for a certificate of competency of the same or of a higher grade. If a candidate desires to be examined for a sailing-ship endorsement only, he must possess a certificate of competency of at least the same grade as the endorsement which he requires.

A candidate may be examined for a fore-and-aft sailing-ship endorsement if he has served the requisite time in fore-and-aft vessels.

74. Second Mate, Sailing-ship Endorsement.—The candidate must understand and give satisfactory answers on the following subjects:—

- (a) The standing and running rigging of ships.
- (b) Bending, unbending, setting, reefing, taking in, and furling sail.
- (c) Sending masts and yards up and down, &c.
- (d) Management of a ship when under canvas.
- (e) The Rule of the Road as regards sailing-vessels, their regulation lights and fog and sound signals.
- (f) Any questions appertaining to the duties of a second mate of a sailing-ship that the Examiner may think necessary to ask.

75. First Mate, Sailing-ship Endorsement.—In addition to the qualifications required for a second mate's sailing-ship endorsement, the candidate will be required to show a knowledge of the following subjects:—

- (a) Shifting large spars, rigging sheers, taking lower masts in and out.
- (b) How to moor and unmoor ship; to keep a clear anchor; and to carry out an anchor.
- (c) How to manage a ship in stormy weather, and to cast a ship on a lee shore.
- (d) How to secure the masts in the event of accident to the bowsprit.
- (e) How to rig purchases for getting heavy weights, anchors, machinery, &c., in or out.
- (f) How to get a cast of the deep sea lead in heavy weather.
- (g) Accidents, and how to deal with them.
- (h) Any other questions appertaining to the duties of first mate of a sailing-ship which the Examiner may think necessary to ask.

76. Master, Sailing-ship Endorsement.—In addition to the qualifications required for the sailing-ship endorsement for second and first mate, the candidate will be required to show a knowledge of the following subjects:—

- (a) Management of ship in heavy weather.
- (b) Rescuing the crew of a disabled vessel.
- (c) Steps to be taken when a ship is on her beam ends, or in any danger or difficulty, or disabled or unmanageable and on a lee shore.
- (d) Heaving a keel out.
- (e) Any other question appertaining to the management of a sailing-ship which the Examiner may think it necessary to ask.

CERTIFICATES FOR HOME-TRADE SHIPS.

77. Wireless Qualifications for Home-trade Ships.—Every candidate for a certificate of competency as master home-trade, mate home-trade, or second mate home-trade, will require to produce, on every occasion on which he presents himself for examination for his first certificate of competency, a valid certificate as "Wireless Signaller," or a wireless certificate of a higher class than "Wireless Signaller." (See Appendix E.)

CANDIDATES' MINIMUM AGE AND SERVICE, ETC.

[NOTE. — Sea-service qualifications are shown in tabular form in Appendix J.]

78. Second Mate.—A candidate must be not less than nineteen years of age, and have served three years at sea, or one year at sea and two years in extended river limits.

SYLLABUS.

(Read, write a legible hand, and spell correctly. This will be tested by not less than 15 minutes' dictation.)

79. Paper 1.—Arithmetic and Navigation. (Two hours.)

- (a) The first five rules, both simple and compound.
- (b) Find the distance from a point or light by the methods shown in the "New Zealand Nautical Almanac" of 1925, on pages 105 and 108, or on pages 135 to 138 of Tables of Azimuth, Great Circle Sailing, &c., published by the Marine Department.
- (c) Find the times and heights of high and low water at any place for which time differences are given in the New Zealand Nautical Almanac.

80. Oral.

- (a) International regulations for prevention of collision at sea.
- (b) Bending, unbending, setting, reefing, taking in, and furling sail.
- (c) Knowledge of cargo work, and ventilation of holds.
- (d) Management of boats under oars and sail and in heavy weather, landing in surf.
- (e) Distress and pilot signals—penalties for misuse.
- (f) Marking and use of ordinary lead line; mechanical logs.
- (g) Use and management of rocket apparatus and knowledge of ports where such is maintained.
- (h) Engine-room telegraphs; sluices; ballast tanks, &c.
- (i) Possess a knowledge of the tide, bar, harbour, and storm signals as used within New Zealand.
- (j) Explain the marking, signs, and abbreviations on Admiralty charts and plans.
- (k) Read an aneroid barometer and thermometer, and understand their use.

Signals : To send and receive signals in—

- (a) British semaphore up to eight words per minute.
- (b) Morse code by flash-lamp up to six words per minute.
- (c) International Code of Signals and Allied Signal Manual.

Any question appertaining to the duties of the second mate of a home-trade ship which the Examiner may think necessary to ask.

MATE.

81. A candidate must be not less than twenty years of age, and have served four years at sea, or two years at sea and two years in extended-river limits.

SYLLABUS.

(Read, write a legible hand, and spell correctly. This will be tested by not less than 15 minutes' dictation.)

82. Paper 1.—Arithmetic and Navigation. (Two hours.)

- (a) As for second mate home-trade.
- (b) To find the latitude by meridian altitude of sun.
- (c) To find the true amplitude or azimuth of the sun by means of azimuth or amplitude tables, and from a compass bearing to find the compass error and deviation, the variation being given.

83. Paper 2.—Chart Work. (Three hours.)

- (a) Understand the use of a Mercator's chart, and be able to find on a chart or plan the course or courses to steer and the distance or distances from one given position to another.
- (b) Find the ship's position together with the set and drift (if any) on a chart or plan from cross bearings of two objects.
- (c) Find the ship's position from two bearings of the same or different objects, the course and distance run between taking the bearings being given, making due allowance for a given tidal stream or current; also the distance of the ship from the object or any given position at the time of taking the second bearing.
- (d) Find on a chart or plan the course to steer by compass in order to counteract the effect of a given tidal stream or current, and to find the distance the ship will make good towards a given point in a certain time.
- (e) To fix the ship's position by wireless cross bearings applying the necessary corrections.
- (f) Work out practically the correction to apply to soundings taken at a given time and place to compare with the depths marked on the chart.

- (g) Fix the ship's position by horizontal sextant angles, using a station-pointer for plotting them on the chart or plan, &c.
- (h) Give a method of finding approximately the time of high water at any place without the aid of the Admiralty or other tide tables.

84. Oral.

- (a) International regulations for prevention of collisions at sea and everything in para. 80 for second mate home-trade.
- (b) Anchor work; coming alongside; mooring and unmooring.
- (c) Fire-extinguishing appliances.
- (d) Rigging purchases for getting heavy weights in or out.
- (e) Handling of ship; rigging sea anchor, &c.
- (f) Use of sextant; to be able to observe with it, to read off and on the arc, and find the index error.

Any question appertaining to the duties of the mate of a home-trade ship which the Examiner may think necessary to ask.

MASTER.

85. A candidate must be not less than twenty-three years of age, and have served five years at sea, or three years at sea and two years in extended river limits, of which—

- (a) One year must have been in a capacity not lower than that of mate or only mate in the home trade whilst holding a home-trade mate's certificate or a foreign-going second mate's certificate; or
- (b) Two years and a half must have been in a capacity not lower than second mate in the home trade in charge of a watch whilst holding a home-trade mate's certificate or a foreign-going second mate's certificate (see para. 116); or
- (c) One year and a half must have been in a capacity not lower than that of second mate of a home-trade ship which is required by law to carry a certificated second mate; whilst holding a home-trade mate's certificate or a foreign-going second mate's certificate; or
- (d) One year must have been as master of a cargo vessel plying in the home trade whilst holding a certificate of competency as master of a cargo vessel under 25 tons register; or
- (e) One year must have been as master of a vessel of 50 tons register or upwards plying in the home trade whilst holding a certificate of service as master of a vessel of 50 tons register or upwards; or
- (f) One year and a half must have been as master of a vessel plying in the home trade whilst holding a certificate of service as master of a vessel under 50 tons register.

SYLLABUS.**86. Paper 1.—Practical Navigation.** (Three hours.)

- (a) To find the latitude by meridian altitude of sun or star.
- (b) To find the distance from a point by methods published in New Zealand Nautical Almanac.
- (c) To answer certain practical questions on the subject of compass deviation.
- (d) To find the magnetic bearing of a distant object by swinging on equidistant compass points; to compute a deviation table.

87. Paper 2.—Practical Navigation. (Two hours.)

- (a) To find the true bearing of the sun or of a star by means of azimuth or amplitude tables; and from a compass bearing to find the compass error and deviation; variation being given.
- (b) To find longitude by chronometer from an altitude of sun or star, computing the daily rate of a chronometer from errors observed, when such is required; or
- (c) Find the position of ship by two stars at twilight, or by one star combined with the bearing of a distant mountain or headland, or sounding, by means of azimuth and reduction tables.

88. Paper 3.—Chart Work. (Three hours.)

A more extensive knowledge of the chart-work syllabus for mate.

89. Paper 4.—English. (One hour and a half.)

The paper will be designed to test the candidate's ability to write clear and grammatical English, with due attention to spelling and penmanship. It will be in no sense a test of technical knowledge.

90. Oral.

- (a) International regulations for the prevention of collision at sea, and everything in paras. 80 and 84 prescribed for first and second mate.
 - (b) Handling a ship under different circumstances.
 - (c) Preservation of crew and passengers in event of wreck.
 - (d) Rescuing the crew of a disabled ship.
 - (e) Construction of jury rudders and sea-anchors.
 - (f) A fuller knowledge of mechanical sounding-machines and logs.
 - (g) Best arrangement for towing vessels under different circumstances.
 - (h) Understanding the effect produced by filling and emptying ballast tanks and loading and unloading cargo on the centre of gravity of the ship as a whole; the danger of free liquid surfaces in tanks and holds.
 - (i) Law as to the engagement, discharge, and management of the crew and the entries to be made in the official log book.
 - (j) Understand the use of a mercurial barometer.
- Any question appertaining to the duties of the master of a home-trade ship which the Examiner may think necessary to ask.

MASTER OF A CARGO VESSEL UNDER 25 TONS REGISTER.

91. A candidate must be not less than twenty-three years of age, and have served—

- (a) Four years at sea, or
- (b) Two years at sea and two years in extended river limits.

In each case not less than one year must have been served in the same class of vessel as that for which the certificate is desired.

SYLLABUS.

(Read, write a legible hand, and spell correctly. This will be tested by not less than 15 minutes' dictation.)

92. Paper 1.—Arithmetic and Navigation. (Two hours.)

- (a) Same as second mate home-trade.
- (b) Find the compass deviation and error by bearings of two objects in transit.

93. Paper 2.—Chart Work. (Three hours.)

- (a) Understand the use of a Mercator's chart and be able to find on it the course to steer and the distance from one given position to another.
- (b) Find the ship's position on the chart from cross bearings of two objects, and from two bearings of the same or different objects, the course and distance run between taking the bearings being given, also the distance of the ship from the object at the time of taking the second bearing.

94. Oral.

- (a) International regulations for prevention of collisions at sea and subjects for second mate home-trade.
- (b) Handling a vessel in different circumstances.
- (c) Signals as for second mate.

Any question appertaining to the duties of the master of this class of vessel which the Examiner may think necessary to ask.

MASTER OF A FISHING-BOAT.

95. The minimum age and service for a certificate as master of a fishing-boat are identical with those prescribed for master of a cargo vessel under 25 tons register, excepting that not less than one year of the four years required must have been served in a fishing-vessel.

96. **Examination.**—The examination for a certificate as master of a fishing-boat is identical with that for master of a cargo vessel under 25 tons register, excepting that in the oral examination the candidate will be examined appertaining to the duties of the master of a fishing-boat.

97. **Master of a River Steamer.**—A candidate must be not less than twenty-three years of age and have served at least two years at sea or as deck hand under a duly certificated master on a vessel plying within extended river limits.

SYLLABUS.

(Read, write a legible hand, and spell correctly. This will be tested by not less than 15 minutes' dictation.)

98. Paper.—Arithmetic. (Two hours.)

The first five rules, both simple and compound.

99. Oral.

- (a) International regulations for prevention of collision at sea.
- (b) General harbour regulations. Colonial bar and tidal signals, and the Dominion system of buoyage.
- (c) Explain the marking signs and abbreviations on Admiralty charts and plans.
- (d) Marking and use of the ordinary hand lead.
- (e) Methods of towing in slack water and in tideway.
- (f) Boxing the compass by quarter points and taking a bearing.
- (g) The use of two fixed objects in line, and how such objects indicate the effect of a stream on the course of a vessel.

Any questions appertaining to the duties of the master of a steamer employed within river limits and extended river limits which the Examiner may think necessary to ask.

MASTER OF SAILING-SHIP PLYING IN HARBOURS AND RIVERS.

100. A candidate must be not less than twenty-three years of age and have served at least two years at sea, or as deck hand under a duly certificated master on a vessel plying within harbour or river limits.

SYLLABUS.

(Read, write a legible hand, and spell correctly. This will be tested by not less than 15 minutes' dictation.)

101. Paper 1.—Arithmetic. (Two hours.)

The first five rules, both simple and compound.

102. Oral.

- (a) International regulations for preventing collision at sea.
- (b) Local harbour regulations.
- (c) Explain the marking, signs, and abbreviations on Admiralty plans.
- (d) Marking and use of ordinary hand lead.
- (e) Boxing the compass by quarter points.
- (f) Handling of a sailing-ship under different circumstances.

Any questions appertaining to the duties of the master of a harbour sailing-ship which the Examiner may think necessary to ask.

103. Yacht Certificates.—The examination for these certificates is purely voluntary, and is confined to persons who command their own British sea-going pleasure yachts. A master of a yacht who is not also the sole owner, or who is under twenty-one years of age, is not eligible for examination.

Only one description of certificate will be issued, whether the yacht is foreign-going or home-trade.

The certificate will not entitle the holder to command any vessel except the pleasure yacht or yachts of which he is at the time the sole owner.

Candidates are not required to have served any specified time afloat, as it is believed that their sea knowledge will be sufficiently tested by the examination they will have to pass in seamanship.

Testimonials as to character, including sobriety for at least twelve months preceding the date of application to be examined, will be required of all candidates.

Testimonials of service need not be shown, but a candidate for examination will be required to produce a statutory declaration to the effect—(1) That he is sole owner of the yacht; (2) that the yacht is sea-going; (3) that it is not to be used for trading purposes. He will also be required to fill up the form of application (form Exn. 2), and pay the fee of £2 at a Mercantile Marine Office.

In all other respects, except that the candidate will not be required to produce a "First-aid" certificate, the regulations relating to the examinations of masters of foreign-going ships will apply. (86.)

104. Yacht Master: Written Examination.—The written examination for a yacht master's certificate will be the same as that prescribed for a foreign-going master's certificate, except that he will be required to take the papers in navigation and chart work laid down for first mate and that the papers on ship's business and engineering knowledge will be omitted from the examination. (87.)

105. Yacht Master : Oral Examination.—He must give satisfactory answers as to his knowledge of making and taking in sail, and as to the management of a yacht under canvas in moderate and in stormy weather. He must have a thorough knowledge of the rule of the road at sea as regards both steamers and sailing-vessels, their regulation lights and fog and sound signals; and be able to describe the signals of distress, and the signals to be made by ships wanting a pilot, and the liabilities and penalties incurred by the misuse of these signals. He must also understand the use and management of the rocket apparatus in the event of his vessel being stranded. He must be able to mark and use the lead and log lines; to cast a vessel on a lee shore; to moor and unmoor a yacht; to keep a clear anchor, and to carry out an anchor. He must know how to keep his vessel out of the trough of the sea in the event of accident; how to rig rafts and jury rudders, &c., and what steps to take if his vessel is disabled or unmanageable, and drifting towards a lee shore. He will also be examined as to his resources for the preservation of the crew in the event of wreck. He must possess a knowledge of the measures he should adopt for preventing and checking an outbreak of scurvy on board. He will also be expected to possess a knowledge of what the master of a yacht is required to do by the Merchant Shipping Acts and the Shipping and Seamen Act, 1908, and to answer any other questions relating to the management of a yacht, either steam or sailing, which the Examiner may ask. (88.)

CERTIFICATES FOR PLEASURE YACHTS IN NEW ZEALAND WATERS.

106. Age, Requirements, &c.—A candidate must be not less than nineteen years of age.

The examination for these certificates is purely voluntary, and is confined to those who own or part own pleasure yachts in New Zealand waters. The certificate will not entitle the holder to command any vessel except a pleasure yacht in New Zealand waters.

Candidates are not required to have served any specified time afloat, as it is believed that their sea knowledge will be sufficiently tested by the examination they will have to pass in seamanship.

Testimonials as to character, including sobriety for at least twelve months preceding the date of application to be examined, will be required of all candidates.

A candidate will be required to produce a statutory declaration to the effect—(1) That he is the sole or part owner of a yacht; (2) that the yacht is sea-going; (3) that it is not to be used for trading purposes. He will also be required to fill up the form of application (Form Exn. 2), and pay the fee of £1 at a Mercantile Marine Office, as prescribed in para. 4. In all other respects, except that the candidate will not be required to produce a first-aid certificate, the regulations relating to the examinations of masters of home-trade ships will apply in these cases. (88 N.Z.)

EXAMINATION.

The examination in navigation will be the same as that for master home-trade.

107. Voluntary Examination in Compass Deviation.—Any person holding a certificate as master or mate of any grade in the foreign trade, or as master or first mate home-trade, or as master of his own pleasure yacht, who wishes to pass a voluntary examination in compass deviation, can be examined at any port where examinations are held, upon filling up the form of application (Exn. 2) and paying the fee of £1.

If the candidate passes, the fact, with the date and place of passing, will be endorsed upon his certificate. (89.)

108. (1) Voluntary Examination in Signalling.—All persons who hold, or have passed for, or are candidates for, a certificate of competency of any grade may undertake the voluntary examination in signalling.

If the candidate passes, the fact, with the date and place of passing, will be recorded upon his certificate of competency. The candidate will be required to attain a minimum speed of twelve words a minute in semaphore and ten words a minute in morse flashing. (See Appendix D.)

Candidates may be examined at any port where examinations are held upon filling up the form of application (Exn. 2) and paying the fee of £1. (See Appendix A.)

No fee, however, will be charged for this examination if it is taken at the same time as that at which a candidate is examined for any certificate of competency.

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(2) **Voluntary Examination for Wireless Signaller.**—(1) Any person being the holder of a foreign-going or a home-trade certificate of competency as mate of any grade, or as master, desiring to become qualified as a wireless signaller should make personal application for this purpose to a District Telegraph Engineer, whereupon, on production of his certificate of competency, arrangements will be made for the examination to be held. If the applicant passes the examination he will be provided with a certificate in the form of an Examiner's authority, which will show that he has passed the examination for wireless signaller, and that, on application for such being made by him to the Secretary for Marine, he is entitled to have his certificate of competency endorsed to that effect.

2. The candidate must deliver his Examiner's authority, together with his certificate of competency, to a Superintendent of Mercantile Marine for transmission to the Secretary for Marine, who will endorse the certificate of competency, "Passed voluntary examination for wireless signaller at _____ on _____, 19__"

Fee: The fee prescribed by the Minister of Telegraphs to be paid by each candidate for each examination on each occasion when he presents himself for examination for a certificate as wireless signaller is 5s. (90.)

109. Government Awards.—Recipients of Government awards can have the fact stamped on their certificates of competency, if they submit evidence of the award together with their certificate to the Marine Department, Wellington, either directly or through the Superintendent of a Mercantile Marine Office. (91.)

CHAPTER III.

RULES FOR ESTIMATING SEA SERVICE.

110. Sea Service.—In these regulations sea service is reckoned from the commencement to the termination of the voyage. The certificates of discharge for service in the foreign trade will generally be accepted as proof of sea service. Examiners will be careful to see that these discharges have not been in any way tampered with, and will report any suspicious cases to the Marine Department. Where service in charge of a watch is required, certificates of watch-keeping service must also be produced. (*See Appendix J.*)

For all certificates of competency as master or mate in the Mercantile Marine, the qualifying service usually required is service performed in ordinary trading-vessels. While the regulations provide for the acceptance in part of certain kinds of non-trading service (*e.g.*, that performed in fishing-boats, yachts, pilot vessels, &c.), non-trading service not specially provided for in the Regulations cannot be accepted as qualifying-service unless it has been submitted to and sanctioned by the Marine Department. (92.)

111. Sea Service for Foreign-going Certificates.—For foreign-going certificates the term "sea service" means, unless otherwise stated, service performed in foreign-going vessels. (93.)

112. Service in Home Trade.—For home-trade certificates, service in the home trade is regarded as equivalent to service in the foreign trade but for foreign-going certificates service in the home trade is regarded as equivalent to two-thirds of the time served in the foreign trade.

The amount of service as master, first mate, or only mate in the home trade which will qualify a candidate for examination for a certificate as master or first mate (foreign-going) is shown in paragraphs 43 and 52.

In addition, the Marine Department will be prepared to consider on its merits any application by a candidate for a first mate's (foreign-going) certificate for the acceptance of time served as second mate in a home-trade ship which is by law required to carry a certificated second mate. The acceptance of such service will be subject to the following general considerations:—

- (a) An adequate proportion of the time must have been spent in actual service at sea—*i.e.*, outside partially smooth water limits.
- (b) The service must have involved real responsibility, and an adequate proportion of it must have been spent in sole charge of a watch at sea.
- (c) The service must have been performed while in the possession of a certificate as second mate (foreign-going).

In all such cases the candidate's application should be accompanied by certificates of watch-keeping service signed by the master. (See Appendix J.)

The proportion of the time which will be accepted will depend upon the particular circumstances of each case, but in no case will time spent in the home trade be accepted as equivalent to more than two-thirds of the same period of time spent in the foreign trade. Every case in which a candidate claims such services as qualifying must be referred to the Principal Examiner.

Service as second mate in the home trade will not be accepted as qualifying for examination for a master's certificate (foreign-going).

Service in a lower grade than second mate in the home trade will not be recognized as officer's service towards qualifying a candidate for examination for a foreign-going certificate unless the candidate can produce a testimonial certifying that the service was merely a preliminary to, or the finish of, a foreign-going voyage in the same ship, and that he served on the foreign voyage in a capacity not lower than the capacity in which he served on the home-trade articles. (94.)

112a. Service in Restricted-limits Ships.—For restricted-limits certificates service in the foreign trade or in the home trade is equivalent to service in river limits or extended-river limits; but time served in ships employed trading within river limits and extended river limits does not count as service at sea for the purpose of obtaining a certificate for a seagoing ship, with the exception that service in extended river limits will, proportionally or wholly, as is prescribed in these regulations, count as qualifying-service for home trade and other New Zealand local certificates.

113. Service in Ships trading Abroad.—Service in ships trading entirely abroad will be accepted as equivalent to service in foreign-going ships provided that the distance between the extreme ports visited during the course of the voyage is at least five hundred miles. If the distance is less than five hundred miles, the service will only be accepted as equivalent to service in the home trade. (95.)

114. Nature of Service determined by Actual Position on Board Ships.—Sea service in the foreign or home trade cannot be regarded as qualifying for examination for certificates of competency unless it can be verified by reference to the articles of the ship in which it was performed—*e.g.*, service claimed by the testimonial or otherwise to have been as mate when the actual rating as shown by the articles was only that of boatswain or other petty officer will not be accepted where officer's service is required. (96.)

115. Officer's Service.—For the purpose of these regulations service as first mate means service as the officer next in seniority to the master. Service as junior or auxiliary first mate, or as first mate under a "chief officer," will count as equivalent to service as the second of three watch-keeping officers for qualifying purposes. The facts in each case must be clearly established by the candidate's certificates of watch-keeping service.

For the definition of "watch-keeping service" see para. 116. (97.)

116. Watch-keeping Service.

(a) For First Mate.—When service in charge of a watch is specified in the regulations candidates for certificates of competency as first mate must be able to prove that out of the eighteen months' service required at least fifteen months have been spent in effective charge of a watch for not less than eight hours out of each twenty-four hours' service at sea. The remaining three months may be service as junior of two watch-keeping officers, but such time will count only as half its duration for qualifying purposes. The exact nature of a candidate's service must be clearly established by a certificate signed by the master in the form indicated in Appendix J.

(b) For Master.—During the whole of the qualifying-service between first mate's and master's certificates that is specified by the regulations, candidates for a master's certificate will be required to have served in full charge of a watch for eight hours out of every twenty-four hours' service at sea. The candidate must produce references from the master stating clearly that he has had sole charge of a watch for eight hours in each twenty-four hours' service at sea.

No service performed under the system of double watches, except as the senior officer, will be accepted as qualifying-service for a certificate of this grade. (98.)

117. Service in Possession of Certificate.—Officer's service, to be recognized as qualifying for purposes of examination, must be performed with the requisite certificate as specified in Appendix I.

The meaning of the term "certificate" as used in the regulations is given in para. 1. The officer's service performed by a candidate who has been duly promoted during the course of a voyage (see para. 118), or who, in consequence of serving in vessels plying between ports abroad, has been unable to obtain the necessary certificates, may, however, be recognized provided that it is in other respects satisfactory. (99.)

118. Promotion during Voyage.—Whenever a man has, from any cause, been regularly promoted on the occurrence of a vacancy in the course of the voyage from the rank in which he first shipped, and such promotion, with the ground on which it has been made, is properly entered in the Articles and in the Official Log Book, he will receive credit for his service in the higher grade for the period subsequent to his promotion. (100.)

119. Mixed Service.—Where a candidate has performed his sea service in more than one capacity, or partly in the foreign trade and partly in the home trade, proportionate allowances will be made for each kind of service, provided that in other respects it complies with the regulations. (101.)

120. Evidence as to Service in Foreign Vessels.—The testimonials of service of foreigners and of British officers and seamen serving in foreign vessels which cannot be verified by the Registrar-General of Shipping and Seamen, London, or by the Marine Department must be confirmed either by the Consul of the country to which the ship in which the candidate served belonged or by some other recognized official authority of that country, or by the testimony of some credible person having personal knowledge of the facts required to be established. The production, however, of such proofs will not of necessity be deemed sufficient. Each case will be decided on its own merits, and if the sufficiency of the proofs given appears to be at all doubtful, it must be referred to the Principal Examiner, who will, if necessary, transmit it to the Marine Department for decision. (103.)

121. Service as Carpenter, Sailmaker, Cook, Steward, &c.—Candidates whose service has been performed in capacities other than apprentice, midshipman, cadet, ordinary seaman, or able seaman, or in the case of restricted-limits ships, as deck hand—*e.g.*, men who have served as carpenter, or sailmaker, or as cook in small vessels where cooking is only a part of a man's duty—will be required to satisfy the Examiner or the Marine Department that they have, during the whole time claimed, performed deck duties in addition to their own particular work. These facts may possibly be proved by the production of satisfactory certificates from the masters with whom the candidate has served; but such service will only be accepted as equivalent to two-thirds of the time served as ordinary deck hand. Failing satisfactory evidence, the applicant will be required to perform additional service in the capacity of seaman. Service as cook (under other conditions than the above), or as steward, or purser, or in the engine-room, will not be accepted. (104.)

When discharges for "boy's" service are produced, the Examiner must satisfy himself that such service was service performed in a qualifying capacity.

122. Service as Wireless Operator.—If a candidate has been engaged on Articles of Agreement as seaman, or in any seaman rating, and has served both as a seaman and as a wireless operator, two-thirds of such service may be counted as qualifying-service; but the candidate must prove that during the whole period claimed he performed deck duties in addition to the duties of a wireless operator.

If a candidate has been engaged on Articles of Agreement as a wireless operator, and has performed deck duties in addition, two-thirds of such service may be counted as qualifying-service provided that the candidate can produce a certificate from the master to the effect that he has performed deck duties throughout the voyage for a reasonable proportion of time each day and that he has not spent more than two hours a day on regular wireless watch.

If a candidate has been engaged on Articles of Agreement as a wireless operator, and has only served as such, one-quarter of the service may be counted as qualifying-service, but no amount of such service will be allowed to count as more than twelve months' qualifying-service. (105.)

123. Apprentices.—The whole of the time claimed under indentures of apprenticeship will be accepted as actual sea service to qualify under para. 34 for a second mate's certificate provided (a) that the indentures have not been cancelled through some fault of the candidate, but are endorsed by the owner or master to whom he was bound to the effect that he has performed his service faithfully during the time he remained as apprentice; and (b) that the candidate has served at sea four-fifths of the time claimed—that is to say, has not spent more than one-fifth of the time in home ports.

2. In cases where an apprentice is qualified for examination before the expiration of his indentures—*e.g.*, where he has had training-ship or other sea service prior to being bound, which, together with his actual time as apprentice, makes up the required four years, or where his indentures are for a period of more than four years, a letter from the owner or master will be accepted in place of the endorsement referred to above.

3. In the event of the candidate being short of the required four-fifths of the time claimed as apprentice out of the United Kingdom, he will be required to show sufficient additional sea service, either as seaman or junior officer, to make up the four-fifths of the time claimed.

4. The above-stated general concession to apprentices cannot, however, be taken to cover a case in which, during a large proportion of the period of apprenticeship, the vessel on which the apprentice is serving has been laid up in a foreign port. The proportion of the period of apprenticeship which can be accepted as qualifying service in such a case is dependent on the actual circumstances, and each case will be considered on its merits. The Marine Department are prepared to make as generous an allowance for such service as they properly can, but they are unable to forego the essential condition that candidates for certificates of competency must have sufficient experience of actual sea service.

5. In the case of cable ships the time may be counted in full if two-thirds of this period of four-fifths—that is, eight-fifteenths of the whole time under indentures—has been spent in service on board the ship out of the United Kingdom and away from the ship's base port (para. 136.) (106.)

124. Midshipmen and Cadets.—The whole of the time served as midshipman or cadet under indentures will also be accepted subject to the same conditions as those laid down for apprentices; and the same will be the case even when not bound by indentures, provided that the service as midshipman or cadet has been continuous, that on the date of the termination of the period of service claimed in this capacity the candidate was on Articles of Agreement, and that he is able to comply with the requirements laid down in the matter of serving or making up the four-fifths period at sea during the time claimed. (107.)

125. Training-ships.—Time served after the age of fourteen on board the training-ships "Worcester," "Conway," and "Amokura," will be allowed to count as equivalent to one-half the same time spent in service at sea, up to a limit of two years (*i.e.*, no length of service will be allowed to count as more than one year at sea), provided that the candidate can produce a certificate from the Committee or Captain Superintendent that he has conducted himself creditably and passed a good examination in seamanship so far as it is practised in the training-ship, as well as in other matters down to the time of his leaving the ship. Training-ship service will not be regarded as equivalent to service in square-rigged vessels.

A similar concession is allowed in the case of time spent at the Nautical College, Pangbourne. (108.)

126. Shore Schools for Nautical Training.—Time spent after the age of fourteen at a school for nautical training conducted on premises ashore may be allowed to count in some proportion, not exceeding one-half, as service at sea, provided that—

- (a) The school is recognized under the appropriate Regulations, by the Board of Education, or by the Scottish Education Department, as the case may be;
- (b) After an inspection by one of their Officers the Board of Trade are satisfied that the school gives a training that justifies time spent there being reckoned as part of the necessary qualifying-time for a certificate of competency; and
- (c) The candidate produces a satisfactory certificate as regards conduct and proficiency from the authorities of the school on leaving it.

The schools to which these arrangements may apply are of three kinds :—

(i) Schools at which a boy resides and receives training for a period of years : The maximum remission of sea service that will be allowed in respect of attendance at such a school will be fixed at the time of approval ; it will never exceed twelve months.

(ii) Courses in navigation and seamanship at junior technical schools or similar non-residential institutions which boys attend before going to sea : The maximum remission of sea service in these cases will be fixed at the time of approval ; it will never exceed six months.

(iii) Senior courses in navigation at technical or other similar non-residential schools which candidates attend after completing the whole or the larger part of the service required to qualify for examination for a second mate's certificate : The maximum remission of sea service in these cases will be fixed at the time of approval ; it will never exceed three months.

In the cases of schools of classes (ii) and (iii) the certificates which the candidate produces (para. (c) above) must, in addition, testify to the candidate's continuous and regular attendance at all the approved classes ; and also, in the case of schools of Class (iii), must state the total number of hours during which he has attended at the school.

A candidate who at different times has attended two or more approved schools of nautical training will be allowed a remission of sea service in respect of attendance at each of them, subject to the condition that the total remission of sea service in respect of attendance at approved schools and training-ships will not in any event exceed twelve months.

Time spent at approved schools will not be accepted in lieu of any part of the officer's service required to qualify a candidate for examination for a certificate as first mate or master ; or in lieu of sea service required in consequence of failure in the oral examination. (See para. 19.)

A list of approved schools of nautical training is given in Appendix L. (109.)

127. Service in Naval Training College.—Time spent at the naval college at Dartmouth will, subject to the conditions laid down in para. 126, be permitted to count as equivalent to one-half the same time spent in service at sea, and a similar allowance will be made in respect of time spent on courses on shore after promotion to acting sub-lieutenant, subject to the condition that the total remission of sea service in respect of all time spent on shore shall not exceed twelve months. Time spent in shore training will not be accepted in lieu of watch-keeping service. (110.)

128. Service in Royal Naval Reserve.—Lieutenants, sub-lieutenants, and acting sub-lieutenants of the Royal Naval Reserve who perform sea service on board His Majesty's ships will, if accompanied by a good report, be allowed to count half the time so spent in lieu of qualifying watch-keeping service for certificates of competency as master or first mate, subject to a maximum allowance of six months for each grade of certificate.

The time spent by midshipmen in the Royal Naval Reserve on board sea-going vessels of the Royal Navy will, if accompanied by a good report, be accepted in full as qualifying sea service for a second mate's certificate, subject to a maximum allowance of six months, provided that a reasonable proportion of such time has been spent at sea and that not more than four weeks have been spent on leave.

Service in harbour ships and shore establishments of the Royal Navy will not be accepted as qualifying-service for any grade of certificate. (111.)

129. Service in Royal Air Force.—Officers with certificates as second mate or first mate who hold short service commissions in the Royal Air Force will, if accompanied by a good report, be allowed to count towards qualifying sea service for certificates of competency as first mate or master respectively half the time spent under instruction in aviation at a flying training school, or with a home defence unit, and half the time spent in a fleet air arm or naval co-operation unit, up to a maximum of six months in all for each grade of certificate.

Apprentices and seamen holding short service commissions in the Royal Air Force will, if accompanied by a good report, be allowed to count towards qualifying sea service for a second mate's certificate half the time spent under instruction in aviation at a flying training school, or with a home defence unit, and half the time spent in a fleet air arm or naval co-operation unit, up to a maximum of six months in all, provided that the total remission of sea service in respect of R.A.F. service and time spent in a shore training ship or school shall not in any event exceed twelve months. (112.)

130. Excursion Steamers.—In the case of excursion steamers only such service as can be proved to have been performed at sea will be accepted. (113.)

131. Service in Fishing or Pilot Vessels.—Service performed exclusively in trawlers and other deep-sea fishing-vessels will not qualify a candidate for examination. He must in addition prove the following service:—

- (a) For a foreign-going certificate, service for at least eighteen months in an ordinary trading-vessel in the foreign trade, or the equivalent period, twenty-seven months, in the home trade.
- (b) For a home-trade certificate, service for at least twelve months in an ordinary trading-vessel in the foreign or home trade. (114.)

132. Service in Yachts.—Service in pleasure yachts will be accepted as qualifying-service under the following conditions:—

- (a) It must in all cases be verified by satisfactory proofs, which must set forth clearly and in detail the nature and duration of the service claimed; and it must be distinctly understood that only actual sea service will be accepted, and that service in harbour or ports is inadmissible.
- (b) Service in foreign-going yachts will be accepted in full, and service performed within home-trade limits in sailing yachts of not less than 50 tons net register or in steam yachts of not less than 80 tons gross register will be accepted in the proportion stated in para. 112, but candidates must also show—(1) For a foreign-going certificate, service for at least eighteen months in an ordinary trading-vessel in the foreign trade, or for the equivalent period, twenty-seven months, in an ordinary trading-vessel in the home trade. (2) For a home-trade certificate, service for at least twelve months in an ordinary trading-vessel in the foreign or home trade.
- (c) Service within home-trade limits in sailing yachts of 20 tons net register or in steam yachts of 40 tons gross register will be accepted towards qualifying a candidate for a foreign-going certificate as equivalent to half the same time served in the foreign trade; but no amount of such service shall count as more than two years' service in the foreign trade, and no such service shall count as officer's service to qualify candidates for foreign-going certificates.
- (d) Service within home-trade limits in sailing yachts of not less than 20 tons net register or in steam yachts of not less than 40 tons gross register will be accepted at the ordinary rate as qualifying-service for home-trade certificates; but candidates must prove that they have in addition served for at least twelve months in an ordinary trading-vessel in the foreign or home trade.
- (e) Service within home-trade limits in sailing yachts of less than 20 tons net register or in steam yachts of less than 40 tons gross register will not be accepted as qualifying-service for any class of certificate. (115.)

133. Service in Tugs, War Department Vessels, &c.—Service performed in tugs employed in Channel service or outside extended or partially smooth-water limits may be accepted as sea service for the purpose of qualifying a candidate for a second mate's, first mate's, or master's certificate for home-trade ships only.

Service performed in War Department vessels employed outside extended or partially smooth-water limits (*see* para. 135) may be accepted as sea service to qualify a candidate for a second mate's, first mate's, or master's certificate for home-trade ships only. This service cannot be accepted towards qualifying a candidate for a foreign-going certificate unless there should be some very exceptional circumstances, when the case, together with all the candidate's papers, should be submitted to the Principal Examiner for consideration. (116.)

134. Service in Dredgers.—Service in steam hopper barges may, subject to the provisions of para. 135, be allowed to count towards qualifying a candidate for a second mate's or a first mate's certificate of competency for home-trade ships, provided the candidate can prove at least two years' service in an ordinary trading vessel in either the home or foreign trade. Service in these steam hoppers will not be accepted as officer's service towards qualifying a candidate for a master's certificate for home-trade ships. (117.)

135. Service on Rivers.—Service performed on rivers, no matter of what size, and service performed within extended river limits, will not, with the exception mentioned in para. 112A, be accepted.

Where any doubt whatever exists on this point the candidate will be required to produce a certificate from the master or owner of the vessel in which the service was performed before the acceptance of the service can be considered. (118.)

136. Service in Cable Ships.—A candidate, a part of whose qualifying-service has been performed in cable ships, will be required to produce, in addition to the usual evidence of sea service, a statement or certificate from the owners of the ship showing the amount of time actually spent at sea. If the time so spent constitutes or exceeds two-thirds of the total time on articles, this total time may be accepted in full as qualifying-service; but in the event of the actual sea service falling below this proportion, the deficiency must be made up by additional service at sea before the total time on articles can be accepted in full as qualifying-service. (119.)

137. Lighthouse Tenders.—Service performed in the sea-going steam vessels of Trinity House, of the Commissioners of Northern Lighthouses, of the Commissioners of Irish Lights, or of the New Zealand Government, or in Irish and Scottish fishery cruisers, will be accepted as sea service for the purpose of qualifying a candidate for examination for a home-trade certificate; but for a foreign-going certificate a candidate must show, in addition to this service, calculated in accordance with para. 112, at least twelve months in an ordinary trading-vessel. (120.)

138. Service in Lightships.—Service in lightships will not be accepted as sea service. (121.)

CHAPTER IV.

CONDUCT OF THE EXAMINATIONS.

139. The examinations will begin at 10 a.m. on each day. A luncheon interval of one hour will be given each day at a suitable hour. As far as possible, candidates will be given ample notice of the day and time of their oral examination. The time allotted for each written part of the examination for each grade of certificate will be as follows:—

1. Second Mate (Foreign-going).

First Day.

Knowledge of Principles 3 hours.
Practical Navigation I (including Tides) 2 hours.

Second Day.

Practical Navigation II 3 hours.
Chart Work 2 hours.

Third Day.

Cargo Work and Elementary Ship Construction .. 3 hours.
English 1½ hours.

Fourth or Subsequent Days—Orals.

2. First Mate (Foreign-going).

First Day.

Practical Navigation I 3 hours.
Chart Work 2 hours.

Second Day.

Ship Construction and Stability 3 hours.
Practical Navigation II 2 hours.

Third Day.

Ship's Maintenance, Routine, and Cargo Work .. 3 hours.
Meteorology 2 hours.

Fourth or Subsequent Days—Orals.

3. Master (Foreign-going).

<i>First Day.</i>					
Practical Navigation	..	..	..	..	3 hours.
Meteorology	..	..	..	..	2 hours.
<i>Second Day.</i>					
Ship Construction and Stability	..	..	..	..	3 hours.
English	..	..	..	..	2 hours.
<i>Third Day.</i>					
Ship's Business	..	..	..	..	2 hours.
Compass	..	..	..	..	2 hours.
<i>Fourth Day.</i>					
Engineering Knowledge (including carriage of refrigerated cargoes)	..	..	..	..	3 hours.
<i>Fifth or Subsequent Days—Orals.</i>					

4. Extra Master.

<i>First Day.</i>					
Mathematics	..	..	..	..	3 hours.
Magnetism and Electricity	..	..	..	..	3 hours.
<i>Second Day.</i>					
General Science	..	..	..	..	3 hours.
Commercial and Legal Knowledge	..	..	..	..	2 hours.
<i>Third Day.</i>					
Navigation	..	..	..	..	3 hours.
Chart Work	..	..	..	..	2 hours.
<i>Fourth Day.</i>					
Chart Construction and Marine Surveying	..	..	..	..	3 hours.
Oceanography and Economic Geography	..	..	..	..	3 hours.
<i>Fifth Day.</i>					
Construction, Working, and Upkeep of Ships	..	..	..	..	3 hours.
Orals as requisite.					

5. Second Mate (Home Trade).

<i>First Day.</i>					
Arithmetic and Navigation	..	..	..	..	2 hours.
Dictation and orals as convenient.					

6. First Mate (Home Trade).

<i>First Day.</i>					
Practical Navigation	..	..	..	..	2 hours.
Chart Work	..	..	..	..	3 hours.
Dictation and orals as convenient.					

7. Master (Home Trade).

<i>First Day.</i>					
Practical Navigation	..	..	..	..	2 hours.
Chart Work	..	..	..	..	3 hours.
<i>Second Day.</i>					
Navigation	..	..	..	..	3 hours.
Essay	..	..	..	..	1½ hours.
Orals as convenient.					

8. Master of a Cargo-vessel under 25 Tons or Master of a Fishing-boat.

<i>First Day.</i>					
Arithmetic and Navigation	..	..	..	..	2 hours.
Chart Work	..	..	..	..	3 hours.
Dictation and Orals as convenient.					

9. Master of a River-steamer or Master of a Sailing-ship plying in Harbours and Rivers.

<i>First Day.</i>					
Arithmetic	..	..	..	..	2 hours.
Dictation and Orals as convenient.					

140. Candidates to be punctual.—Candidates are required to appear at the examination-room punctually at the time appointed. (123.)

141. No Strangers admitted.—No person will be allowed in the room during the examination, other than those whose duties require them to be present.

No instructors will be allowed on the premises. (124.)

142. Loose Papers and Books removed.—Before commencing the examination, the tables or desks must be cleared of all scraps of paper or books that are not used in the examination. (125.)

143. Use of Books and Tables at the Examinations.—The following tables and books will be supplied by the Marine Department at the examination-rooms:—

Nautical Tables (including logarithm tables) Norie (full edition), Raper (full edition), Inman (full edition), Blackburne (Vol. I, Tables for Azimuths, Great-circle Sailing, and Reduction to the Meridian).

Alt-Azimuth Tables.—Burdwood, Davis.

Admiralty Tide Tables.—Parts I and II.

Nautical Almanac.—1929 Abridged Edition.

Candidates who wish to use other tables than the above may bring such tables into the examination-room, on condition that they submit them to the Examiner before the commencement of the examination for scrutiny and approval. These tables must contain no manuscript notes. Subject to the Examiner's approval, no restriction will be placed on the use of any tables, but candidates must understand the theory on which the tables are based and such tables must be capable of giving an answer within the required limits of accuracy (*see para. 157*). When tables other than those supplied by the Marine Department are used in answering a question, the name of the tables and a note of what is actually obtained from them should be stated on the candidate's paper. (126.)

144. Use of Instruments.—All instruments necessary for use in the examinations are supplied by the Marine Department, but candidates will be allowed to use their own drawing instruments and slide rules provided that the Examiner's approval is obtained before the commencement of the examination. (127.)

145. Unauthorized Books and Papers strictly forbidden.—Candidates are prohibited from bringing into the examination-room books or papers of any kind whatever, other than mathematical tables. The slightest infringement of this regulation will subject the offender to all the penalties of a failure, and he will not be allowed to present himself for re-examination for a period of three months.

A candidate who uses his own mathematical tables or instruments without first obtaining the permission of the Examiner will be subject to the same penalty. (128.)

146.—Injury to Books, Instruments, &c.—If a candidate defaces, blots, writes in, or otherwise injures any book or form or damages any instrument belonging to the Marine Department, his papers will be retained until he has replaced the damaged book, document, or instrument. He will not be allowed to remove the damaged book or document or instrument, and will be subjected to all the penalties of a failure. (129.)

147. Leaving Room or Building.—No candidate must leave the examination-room without permission and without giving up the paper on which he is engaged. Under no circumstances will a candidate be allowed to leave the building while the examination is proceeding. Violation of this rule will subject the candidate to all the penalties of a failure. (130.)

148. Silence.—Silence is to be preserved in the examination-room. (131.)

149. All Work to be shown.—No candidate will be allowed to work out his problems on waste paper, or to write on the blotting-paper supplied for his use in the examination. Violation of this rule will subject the candidate to all the penalties of a failure.

A sheet of blotting-paper should be issued to each candidate with the first examination-paper, and it must be returned to the Examiner when the last paper is completed each day. The Examiner will be careful to see that the blotting-paper has not been used by the candidate in solving his problems, or for conveying information to other candidates. (132.)

150. Copying, &c., to be prevented.—Candidates should be so placed as to prevent one copying from another, and no communication whatever between the candidates should be allowed. (133.)

151. Penalty for Copying, &c.—In the event of any candidate being discovered referring to any unauthorized book or paper, or copying from another, or affording any assistance or giving any information to another, or communicating in any way with another, during the time of examination, or copying any part of the problems for the purpose of taking them out of the examination-rooms, he will subject himself to all the penalties of a failure, and will not be allowed to be examined for a period of six months.

A candidate guilty of a second offence will not be allowed to be examined until twelve months have elapsed. (134.)

152. Conduct of the Written Examination.—For his written work the candidate will be furnished with sheets of the blank ruled paper which is supplied for the purpose with instructions that he is to work or write only on one side of the paper, and to answer in a clear and legible hand each of the questions on the paper, and to commence each answer by writing in the margin the number of the question to which it relates. (135.)

153. Percentage of Marks required for a Pass in the Written Examination.—To pass in the written portion, a candidate will be required to obtain 70 per cent. of the total marks for all subjects, and he will also be required to obtain a minimum of 50 per cent. in each of the following subjects:—

Second Mate (Foreign-going)—

Knowledge of Principles.

Practical Navigation (I and II).

Chart Work.

First Mate (Foreign-going)—

Practical Navigation (I and II).

Chart Work.

Ship Construction and Stability.

Master (Foreign-going)—

Practical Navigation.

Ship Construction and Stability.

Ship's Business.

Compass.

English.

Mate (Home trade)—

Chart Work.

Master (Home trade)—

Navigation and Compass Deviation (I and II).

Chart Work.

In the examination for extra master, a candidate will be required to obtain 75 per cent. of the total marks for all subjects in order to pass, but he will not be required to reach a minimum percentage on any one paper. (136.)

154. Marks allotted to each Paper.—The table of marks given below shows the number of marks allotted to each paper in the written examination.

(a) SECOND MATE.

	Duration of Paper. Hours.	Marks.
Knowledge of Principles	3	150
Practical Navigation I	2	150
Practical Navigation II	3	200
Chart Work	2	200
Cargo Work and Ship Construction	3	200
English	1½	100
		<hr/> 1,000

(b) FIRST MATE.

Practical Navigation I	3	200
Practical Navigation II	2	150
Chart Work	2	150
Ship Construction and Stability	3	200
Cargo Work, &c.	3	200
Meteorology	2	100
		<hr/> 1,000

(c) MASTER.

Practical Navigation	3	200
Meteorology	2	100
Ship Construction and Stability	3	200
English	2	100
Ship's Business	2	100
Compass	2	150
Engineering Knowledge	3	150
		<hr/> 1,000

(d) EXTRA MASTER.

				Duration of Paper. Hours.	Marks.
Mathematics	..	..	..	3	200
Science	..	..	..	3	200
Navigation	..	..	..	3	150
Chart Work	..	..	..	2	150
Chart Construction and Surveying	..	..	..	3	150
Magnetism	..	..	..	3	200
Ship Construction	..	..	..	3	200
Commercial Knowledge	..	..	..	2	150
Oceanography	..	..	..	3	100
					1,500

(e) SECOND MATE (HOME TRADE).

Arithmetic and Navigation	..	..	..	2	120
Dictation	..	..	..	..	50
					170

(f) MATE (HOME TRADE).

Arithmetic and Navigation	..	..	..	2	160
Dictation	..	..	..	..	50
Chart Work	..	..	..	3	150
					360

(g) MASTER (HOME TRADE).

Navigation	..	..	..	2	100
Navigation	..	..	..	3	100
Chart Work	..	..	..	3	150
English	..	..	..	1½	100
					450

(h) MASTER OF A CARGO-VESSEL UNDER 25 TONS OR A FISHING-VESSEL.

Navigation and Arithmetic	..	..	..	2	110
Dictation	..	..	..	..	50
Chart Work	..	..	..	3	150
					310

(i) MASTER OF A RIVER-STEAMER OR OF A SAILING-VESSEL PLYING WITHIN HARBOUR OR RIVER LIMITS.

Arithmetic	..	..	..	2	100
Dictation	..	..	..	..	50
					150

155. Corrections by Tables.—In the Knowledge of Principles paper for second mate the corrections by inspection of tables given in some of the works on navigation will not be allowed; every correction must appear on the papers of the candidates. (138.)

156. Candidates may use own Method.—Candidates will be allowed to work out the various problems according to any method they have been accustomed to use, provided such method is correct in principle. (139.)

157. Degree of Precision required.—When making calculations for obtaining a ship's position candidates are expected to work to 0.2 of a minute of arc and to the nearest second of time.

The method of calculation used in obtaining a position-line should be capable of giving an answer within 0.5 of a mile.

In calculation of compass errors, bearings, and courses, the answer should be worked to within 0.25 of a degree, but in chart work 0.5 of a degree is sufficient.

In calculating the correction to apply to soundings the candidate is not required to work to the exact inch, as is sometimes done. It will be sufficient if he brings his answer within half a foot or so of a precise result. (140.)

158. Compass Deviation.—In answering questions on the tentative method of compass adjustment, the candidate will be tested by Beall's Compass Deviascope. (141.)

159. Sextant.—Particular attention should be paid to the sextant, the examination in which will be conducted orally and practically. Every candidate will be required to measure both vertical and horizontal angles, and will be examined practically as to his knowledge of the adjustments and the use of the various screws; he must be able to read correctly on and off the arc, and must also be able to find the index error both by the horizon and by the sun. (142.)

160. Rule of the Road.—In the examination on Rule of the Road the Examiner's duty will be to test the candidate's knowledge of the sense and intention of the Articles of the Collision Regulations. Mere ability to repeat the Articles word for word will not suffice to ensure the candidate's passing, nor will the lack of it necessarily entail failure provided the Examiner is satisfied that the candidate grasps the full significance, content, and practical application of the Articles. Examiners will ask for the content of the Articles not by their number, but by the subject with which they deal, and they will discourage the use by candidates of verses as aids to memorizing the Articles. Examiners will not place a candidate for a steamship certificate in the position of handling a sailing-ship, but will lay stress on the candidate's ability to recognize a sailing-ship's lights and on his knowledge of a sailing-ship's possible manœuvres according to the direction of the wind. (143.)

161. No Candidate to be examined in successive Weeks.—A candidate will not be allowed to undergo examination for the same grade of certificate twice in successive weeks, unless, under special circumstances, the Examiner should see fit to relax this rule. (144.)

162. Penalty for Breach of Rules.—Any candidate violating any of the regulations, or being guilty of insolence to the Examiner, or of disorderly or improper conduct in or about the examination-rooms, will render himself liable to the postponement of his examination, or, if he has passed, to the detention of his certificate for such period as the Marine Department may direct. (145.)

163. Examination-papers: How to be dealt with.—The envelopes containing examination-papers when received from Wellington must not be opened by any officer other than the Examiner, and by him only at the commencement of the examination. Should the envelope containing the examination-papers appear to have been opened or in any way tampered with on its arrival from Wellington the Examiner should, if he thinks necessary, defer the examination until the following day, and telegraph immediately to the Principal Examiner in Wellington for a fresh set of papers.

In the event of any case of this kind occurring a full report of the circumstances, and of the steps taken in the matter, should immediately be forwarded to the Principal Examiner.

After the envelopes have been opened, and until the examination-papers are again sealed up and despatched to Wellington, the Examiner must take special precautions to preclude the possibility of any person having access to them. The responsibility of ensuring that this is effectually done will rest with the Examiner. The examination-papers of candidates must in all cases be sent to the Principal Examiner in Wellington for his approval, together with the report of the examination on forms Exn.-14 and Exn.-34.

The envelopes in which the examination-papers are returned to the Principal Examiner must be carefully sealed with the official seal at both the top and bottom, and this must be done under the eye of the Examiner.

APPENDICES.**APPENDIX A.****EXAMINATION DAYS.****CERTIFICATES OF COMPETENCY, ALL CLASSES AND GRADES.**

Auckland—First Monday or Tuesday in February, April, June, August, October, and December.

Lyttelton—Second or third Tuesday in January, April, July, and October.

Wellington—First Monday or Tuesday in each month.

Intending candidates must make application to be examined not later than one week previous to the date on which the examinations are to be held, and they must ascertain from the Superintendent of Mercantile Marine the day on which the examination will commence. Candidates for foreign-going or home-trade certificates who have failed whilst attending any of the examinations at Auckland or Lyttelton may, if they so desire, provided they are eligible and immediate application is made for that purpose to the Examiner, be allowed again to sit for examination during the week succeeding that on which the failure occurred.

APPENDIX B.**SIGHT TESTS.****EXAMINATION DAYS.**

Auckland, Dunedin, Lyttelton, Wellington—Saturday mornings at 10 o'clock, by the Examiners in sight tests. Application to be examined must be made to the Superintendent of Mercantile Marine.

APPENDIX C.**ST. JOHN AMBULANCE ASSOCIATION.****SECRETARIES OF ST. JOHN AMBULANCE ASSOCIATION AT PORTS WHERE EXAMINATIONS ARE HELD.**

Auckland: W. Rattray, Ambulance Station, Rutland Street.

Christchurch: C. J. Treleaven, A.P.A. (N.Z.), 119 Worcester Street.

Dunedin: Rogers, the Octagon, Dunedin.

Wellington: H. C. W. Blick, A.P.A. (N.Z.), 106 Courtenay Place, P.O. Box 168, Te Aro. Phone 21-648.

APPENDIX D.

Examination in Signalling.—The examination in Signalling should in all cases and for all grades consist of an examination in the International Code, and (excepting the master of a river steamer or harbour sailing-ship), the Allied Signal Manual, Morse Flashing and Semaphore.

International Code.—Examiners are recommended to frame the examination in the International Code of Signals upon the instructions and illustrations given at the commencement of Parts I and II of the Signal-book. The information there given will be found sufficient to indicate all the characteristics of the code.

By the form of the hoist, an observer can at sight understand the nature of any signal he sees flying; the examination should, therefore, tend to elicit a clear knowledge of all the distinctive features of the code.

With this object in view, the Examiners should question the candidates as to the distinguishing forms of the respective hoists, which will be indicated according as a burgee, a pennant, or a square flag is uppermost, and also with regard to the number of flags, and the position of the code flag when used in the hoist; making the 1, 2, 3, and 4 flag signals with the flags supplied for the purpose, and varying the signals made, showing 2 and 3 flag signals, with and without the code flag included, or a geographical or a vocabulary signal, the name of a merchant ship or of a ship-of-war.

As the two latter signals would not be found in the Signal-book, the candidate should know where to find them and how to look them out.

The candidate should—

- (a) Be able to read a signal at sight so far as to name the flags composing the hoist.
- (b) Know the use of the code pennant and of the pennants C and D, also of the two burgees A and B, and the square flags S and P, and the flags used to indicate cholera, plague, &c., on board, and the quarantine flag.
- (c) Be required to signal some work or words not included in the vocabulary of the code, either by letters or by the spelling table (page 516), or both.
- (d) Have a knowledge of the distant signals, and of their object, and the different modes of signalling therewith.
- (e) Know the special Morse signals indicated by certain letters as given on page 550.
- (f) Have a good knowledge of the distress signals, and understand the penalty which may be incurred by their improper use.

The International Code is used on board His Majesty's ships, and it has been adopted by all the principal Maritime Powers for their public as well as merchant ships.

Allied Signal Manual.—Candidates will be expected to know the meaning of any or all of the single-flag signals given therein, and the signification of the Pilot Jack when incorporated in a hoist. They should also be required to make or read from the Pilot Jack table a hoist given by the Examiner. Candidates need not be expected to commit the Pilot Jack table to memory, but there should be no hesitation whatever in making or reading a signal. They should also know how to recognize any of the Special Signals given in the Allied Signal Manual.

Voluntary Examination in Signalling.—Candidates will be required to attain a minimum speed of twelve words a minute in semaphore and ten words a minute in Morse flashing (the average length of a word being taken as five letters).

The Morse-flashing test will be a test message (see Allied Signal Manual) followed by a spelling message of twenty-five words.

The Semaphore test will be a spelling message of fifty words.

The candidate must attain a degree of accuracy of at least 90 per cent. both in making and reading in each method—*i.e.*, flashing and semaphore.

Ordinary Examination.—Candidates will be required to attain a minimum speed of eight words a minute in semaphore and six words a minute in Morse flashing.

The Morse-flashing test will be a test message followed by a spelling message of ten words.

The semaphore test will be a spelling message of twenty-five words.

A candidate must for a pass gain an aggregate of at least 90 per cent. of the maximum marks in both spelling and test messages in the Morse flashing and in the semaphore examination.

General.—In the examination in Morse flashing the candidate will be first required to make a test message followed by the spelling message. The candidate should then read a test message followed by the spelling message made by the Examiner.

In the semaphore examination the candidate will make the spelling message, then read one made by the Examiner. The semaphore message may be made either by hand-flags or mechanical semaphore, or both, at the discretion of the Examiner.

Marks will be allotted for the test message in the proportion of 50/78 of a mark for each correct letter (*see* table at back of test-cards) and for the spelling messages two marks for each correct word or group of figures.

The spelling message is left to the discretion of the Examiner, and may be a passage from any book or newspaper in English. When the passage contains figures and the candidate does not choose to spell them out, the Examiner should see that the proper signs are made before and after the figures.

The message as read by the candidate should be taken down by another candidate where possible, otherwise by a clerk, or other person according as the Examiner may deem expedient.

Candidates should be thoroughly tested in the various signs and the procedure of calling up, sending, and answering a signal, as laid down in the Allied Signal Manual, and this course should always be strictly adhered to.

Particular attention should be paid by Examiners to the accurate spacing of the Morse signs, and to the intervals between letters and words, and also to the correct making of the semaphore signs. Any attempted increase of speed at the expense of accuracy should be discouraged.

The test and spelling message as read by the candidate should be forwarded on the form Exn. 19A, together with the percentage of marks allotted on the form Exn. 19B, to the Principal Examiner, with any remarks the Examiner may have to add with respect to the examination.

NOTE:—The International Code of Signals is prepared by the Registrar-General of Shipping and Seamen and may be obtained at the Mercantile Marine Offices of New Zealand.

APPENDIX E.

WIRELESS SIGNALLER.

INSTRUCTIONS TO INTENDING CANDIDATES FOR THEIR FIRST HOME-TRADE CERTIFICATE OF COMPETENCY.

Every candidate for a certificate of competency as master home-trade, mate home-trade, or second mate home-trade, will require to produce, on every occasion on which he presents himself for examination for his first certificate of competency, a valid certificate as "Wireless Signaller," or a wireless certificate of a higher class than "Wireless Signaller."

2. The Examiner's authority must be obtained by the candidate when eighteen years of age or more, and the examination for it must have been passed not more than one year before the date of examination for a certificate of competency.

3. A candidate for examination who does not possess a certificate as wireless operator issued by the Minister of Telegraphs, or its equivalent, should, some time before he wishes to sit for a certificate of competency, apply to a District Telegraph Engineer, who will inform him when and where the examination for wireless signaller may be held.

4. The examination for wireless signaller will be for one grade only, and will be conducted as is prescribed by the Minister of Telegraphs.

The examination will not be of a technical nature, but will be confined to a practical knowledge of how to manipulate the transmitting and receiving apparatus and its appurtenances, and the care and attention of the equipment necessary to produce its efficient operation.

The candidate will be required to send and to receive in prose, for a continuous period of five minutes in each case, at a speed of not less than ten words per minute; and will require to have a working knowledge of the customary procedure to be observed when communications are being established between his station and another station ashore or afloat, and of the regulations applying thereto. Also, he will be examined closely in the procedure to be followed in cases where the distress signal or other important signal is involved.

The fee prescribed by the Minister of Telegraphs to be paid by each candidate for examination is 5s.

APPENDIX F.

EXAMINATION-PAPERS.

(NOTE.—The following are specimen sets of examination-papers for all classes and grades of certificates of competency as master and mate.)

SPECIMEN EXAMINATION-PAPER FOR MASTER OF A RIVER STEAMER OR OF A SAILING-VESSEL PLYING WITHIN A HARBOUR OR RIVER.

ARITHMETIC.

Time allowed: Two hours.

1. Express in figures—Twenty-four millions seven hundred and two thousand; five hundred and nine thousand and four.
2. Add the following quantities together: 1402, 86, 903, 7284, 16708; also add together 72498, 60382, 704, 208, 7.
3. From 6840298 take 3826989; from 684062 take 508349; from 1800426 take 99849; from 1638072 take 899708.
4. Multiply 9886 by 37; multiply 98486 by 3972.
5. Divide 38409687 by 3837; divide 943068 by 14.
6. Add the following quantities together: £8468 9s. 4d., £1306 3s. 10d., £1608 4s. 6d., £3089 11s. 7d. Also add together 9843 tons 16 cwt. 2 qr. 14 lb., 4860 tons 13 cwt. 3 qr. 2 lb., 90 tons 18 cwt. 2 qr. 23 lb., 6028 tons 16 cwt. 1 qr. 3 lb.
7. From £6488 17s. 6½d. take £5840 3s. 9¾d.; and from 54833 tons 16 cwt. 2 qr. 2 lb. take 9808 tons 3 cwt. 0 qr. 4 lb.
8. Multiply the following quantities by 92; £1840 4s. 6d.; 284 tons 16 cwt. 3 qr. 4 lb.
9. Divide the following quantities by 67: £134 2s. 10d.; 609 tons 3 cwt. 1 qr. 18 lb.

SPECIMEN SET OF EXAMINATION-PAPERS FOR MASTER OF A CARGO-VESSEL UNDER 25 TONS, OR FOR MASTER OF A FISHING-BOAT.

1. ARITHMETIC AND NAVIGATION.

Time allowed: Two hours.

1. Express in figures—Thirty-eight millions nine hundred thousand and seven; twenty-five thousand three hundred.
2. Add the following quantities together: 1706, 74, 2, 4835, 972; also add together 987, 22, 9044, 6298, 806.
3. From 4825726 take 3987244; from 8465099 take 2999847; from 6238429 take 5989777; from 78432 take 69586.
4. Multiply 9842 by 68; multiply 8498 by 7286.
5. Divide 94862948 by 1989; divide 694382 by 9.
6. Add the following quantities together: £9248 4s. 9d.; £232 14s. 11d., £6982 3s. 7d., £63 15s. 2d. Also add together 842 tons 13 cwt. 2 qr. 1 lb., 414 tons 11 cwt. 3 qr. 14 lb., 8249 tons 3 cwt. 1 qr. 9 lb., 72 tons 16 cwt. 3 qr. 7 lb.
7. From £92486 16s. 7d. take £7829 4s. 10d.; and from 684 tons 2 cwt. 2 qr. 4 lb. take 399 tons 16 cwt. 3 qr. 2 lb.
8. Multiply the following quantities by 27: £1483 17s. 7d.; 29 tons 16 cwt. 3 qr. 17 lb.
9. Divide the following quantities by 94: £5806 4s. 8d.; and 9663 tons 8 cwt. 1 qr. 15 lb.
10. In a ship making 12 knots on a N. 15° E. course by compass, a point was sighted bearing N. 10° W., and after continuing to make good the same course and speed for 20 minutes the point bore N. 26° W. by compass.
Required—The distance the ship will pass off the point.
11. The bearing of two objects in transit was found on the chart to be S.W. $\frac{1}{4}$ S. mag., but when brought in line on board they bore S.W. $\frac{1}{4}$ W. by compass:
Required—The deviation of the compass for the direction of the ship's head.
12. Required the times of high and low water, a.m. and p.m., at Port Russell on 12th May, 1929, by the tide-tables in the "New Zealand Nautical Almanac."

2. CHART.

Time allowed: Three hours.

1. Using deviation card No. 4, find the course to steer by compass from X to North Cape; also the distance.
 2. With the ship's head on the above-named compass course, Great Barrier Peak (2,330 ft.) bore by compass S. 48° E., and Poor Knights bore S. 50° W. by compass:
Required—The position of the ship.
 3. With the ship's head as above, Cape Brett bore by compass S. 56° W., and after continuing on the same course for 12 miles it bore S. 30° W.:
Required—The position of the ship and the distance from Cape Brett at the time of taking the second bearing.
- All the foregoing questions must be answered; but this does not preclude the Examiner from putting any other questions of a practical nature.

SPECIMEN EXAMINATION-PAPER FOR SECOND MATE (H.T.).

ARITHMETIC AND NAVIGATION.

Time allowed: Two hours.

1. Express in figures—Twenty-four millions seven hundred and two thousand; five hundred and nine thousand and four.
2. Add the following quantities together: 1402, 86, 903, 7284, 16708; also add together 72498, 60382, 704, 208, 7.
3. From 6840298 take 3826989; from 684062 take 508349; from 1800426 take 99840; from 1638072 take 899708.
4. Multiply 9886 by 37; multiply 98486 by 3972.
5. Divide 38409687 by 3837; divide 943068 by 14.
6. Add the following quantities together: £8468 9s. 4d., £1306 3s. 10d., £1608 4s. 6d., £3089 11s. 7d. Also add together 9843 tons 16 cwt. 2 qr. 14 lb.; 4860 tons 13 cwt. 3 qr. 2 lb.; 90 tons 18 cwt. 2 qr. 23 lb.; 6028 tons 16 cwt. 1 qr. 3 lb.
7. From 6488 17s. 6 $\frac{1}{2}$ d. take £5840 3s. 9 $\frac{1}{2}$ d.; and from 54833 tons 16 cwt. 2 qr. 2 lb. take 9808 tons 3 cwt. 0 qr. 4 lb.
8. Multiply the following quantities by 92: £1840 4s. 6d.; 284 tons 16 cwt. 3 qr. 4 lb.
9. Divide the following quantities by 67: £134 2s. 10d.; 6094 tons 3 cwt. 1 qr. 18 lb.

10. In a vessel steering south by compass and steaming 10 knots a point of land bore S. 15° W. by compass, and after making good the course and speed for 15 minutes the point bore S. 30° W. by compass:
Required—The distance of the vessel from the point of land when abeam.
11. Required the times of high and low water, a.m. and p.m., at Tauranga on 12th June, 1929, by the tide-tables in the New Zealand Nautical Almanac.

SPECIMEN SET OF EXAMINATION-PAPERS FOR MATE (H.T.).

1. ARITHMETIC AND NAVIGATION.

Time allowed: Two hours.

- Express in figures—Five millions sixteen thousand seven hundred and six; thirteen millions four thousand two hundred and one.
- Add the following quantities together: 684092, 78064, 90284, 70987, 45298; also add together 4624, 30897, 604838, 908421, 904.
- From 6087241 take 904563; from 64889 take 38421; from 778794 take 389006; from 8296 take 999.
- Multiply 86298 by 999; multiply 684682 by 787.
- Divide 984629 by 378; divide 8406823 by 9984.
- Add the following quantities together: £724 14s. 3d.; £680 19s. 6d.; £280 13s. 10d.; £60 4s. 10d.; Also add together 9846 tons 13 cwt. 2 qr. 3 lb.; 68 tons 3 cwt. 1 qr. 14 lb.; 806 tons 3 cwt. 3 qr. 10 lb.; 983 tons 19 cwt. 3 qr. 7 lb.
- From £39802 14s. 6½d. take £986 17s. 7¾d.; from 68422 tons 13 cwt. 2 qr. 8 lb. take 747 tons 18 cwt. 3 qr. 9 lb.
- Multiply the following quantities by 89: £760 3s. 10½d.; 6089 tons 18 cwt. 2 qr. 16 lb.
- Divide the following quantities by 72: £8049 3s. 6¾d.; 7284 tons 1 cwt. 1 qr. 2 lb.
- On 20th January, 1929, long. by A/c $172^{\circ} 50'$ E., the observed meridian altitude of the sun's lower limb was $70^{\circ} 14' 5''$ north of the observer; index error of sextant $2' 40''$ to add; height of eye 27 ft. Compute the latitude.
- On 15th May, 1929, at 06 h. 50 m., New Zealand mean time, at ship in lat. $41^{\circ} 15'$ S., long. $176^{\circ} 40'$ E., the sun rose bearing by compass N.E.:
Required—the true amplitude and error of the compass; also the deviation, the variation being 15° E.
- A lighthouse is found to be 13 miles distant from the vessel:
Find the angle on the bow to which it should be brought so as to enable the vessel to pass 4 miles off it.

2. CHART.

Time allowed: Three hours.

- Deviation card 12: In a vessel steaming towards Cape Brett Lt. Ho., steering by compass N. 30° W. at 9 knots, Henry Is. bore by compass S. 22° W. and Home Pt. extreme bore S. 75° W. by compass.
State the position of the vessel, and the distance from Home Point.
- From the position as found in question 1 set courses to reach a position with Coal Point bearing 310° 4 miles distant; maintaining a distance of 1 mile off Cape Brett Lt. Ho. and 2 miles off the outer end of the eastern island of the Cavalli Group. On the last course allow for a current which set 340° (N. $34^{\circ} 5'$ W. mag.) at the rate of 2.5 knots.
Required—The compass courses steered, the distance made good on each course, and the distance that the log should show when in final position supposing it to have been set at the position off Home Point.
- When steering the second compass course Ngakotu Raranui Pt. bore by compass S. 6° W., and after continuing on the same course for 4 miles the south end of Cavalli Is. bore by compass S. 58° W. Assuming that the vessel has made good her course and distance between the bearings, state the position of the vessel and the distance from the south end of Cavalli Is. at the time of taking the second bearing.
- The following horizontal angles were taken to determine the position of the ship: Between G and D, $42^{\circ} 20'$; between D and F, $37^{\circ} 40'$.
Required—The position of the ship by station pointer.

5. Arriving off Manukau Bar at 14 h. 00 m., New Zealand mean time, on 16th September, 1929, state the depth of water you would expect to find on the bar if the soundings on the chart showed $3\frac{1}{2}$ fathoms.
6. Chart 695: Find approximately (without the use of Admiralty or other tide-tables) the time of high water on the afternoon of 14th June, 1929, off Stephens Island, and state also the direction of the tidal stream at 10 h. 00 m. on that day.

SPECIMEN SET OF EXAMINATION-PAPERS FOR MASTER (H.T.).

1. NAVIGATION.

Time allowed: Two hours.

1. On 2nd February, 1929, long. by A/c 176° E., the observed meridian altitude of the sun's lower limb was $72^{\circ} 18'$ north of observer; index error of sextant $1' 10''$ to subtract; height of eye 22 ft.
Compute the latitude.
2. In a vessel steering S.E. by compass and steaming 10 knots a light is observed bearing S.S.E. by compass, and after making good the course and speed for 24 minutes the light was observed to bear south by compass.
Required—The course to be steered to enable the vessel to pass 2 miles off the light.
3. Having taken the following compass bearings of a distant object, find the magnetic bearing and thence the deviation on each of the given courses.

Ship's Head by Standard Compass.	Bearing by Standard Compass.	Deviation required.	Ship's Head by Standard Compass.	Bearing by Standard Compass.	Deviation required.
North ..	N. 69° E.		South ..	S. 86° E.	
N.E. ..	N. 54° E.		S.W. ..	S. 82° E.	
East ..	N. 60° E.		West ..	S. 83° E.	
S.E. ..	N. 78° E.		N.W. ..	East ..	

4. The bearing of two objects when in line with each other was found on the chart to be S. 80° W. mag., but when brought in line on board they bore S. 76° W. by compass.
Required—The deviation of the compass for the direction of the ship's head at the time.
5. When taking a meridian altitude, how do you know when the sun is on the meridian; or, in other words, when it is noon?
6. How does the sun bear (true and magnetic) when on the meridian of an observer in these latitudes (home-trade limits).
7. What do you mean by the "deviation" of the compass, and how is it caused?
8. Having determined the deviation, how do you know when it is easterly and when westerly?
9. How could you find the deviation of your compass when in port or when sailing along a coast?
10. Name some suitable objects by which you could readily obtain the deviation of your compass when sailing along the coasts, or the channels you have been accustomed to use.
11. What means are there for checking the deviation of your compass by night?
12. Do you expect the deviation to change? If so, state under what circumstances.
13. What is meant by the "variation" of the compass, and what is the cause of it?

2. NAVIGATION.

Time allowed: Two hours.

1. 1929, 10th June, p.m., in D.R. long. $173^{\circ} 30'$ E., the observed altitude of the sun's lower limb was $12^{\circ} 4'$ when a chronometer indicated 05 h. 03 m. 20 s. Eye elevated 30 ft. Sextant error $2' 0''$ off the arc. The chronometer was 14 m. 10 s. fast of M.T.G. Later, after the ship had made 12 miles on a 130° course, the latitude by meridian altitude of the star Regulus was found to be $40^{\circ} 18'$ S.
Required—The longitude by chronometer at the time when the meridian altitude of Regulus was observed.

(Or, at the Examiner's discretion, as an alternative to Question 1):

On 10th August, 1929, at 18 h. 10 m. New Zealand mean time, at ship in approximate position lat. 47° S., long. 171° E., the observed altitude of the star Achernar was $17^{\circ} 2'$. Height of eye, 28 ft. Index error, $2'4$ to add. After steering west (true) for 12 miles, Nuggets Pt. Lt. was sighted bearing N. 40° W. (true).

Required—The position of the ship when the light was sighted.

2. On 10th March, 1929, at 04 h. 15 m., New Zealand mean time, at ship in lat. $45^{\circ} 0'$ S., long. $171^{\circ} 50'$ E., the star Altair bore by compass E.N.E.

Required—The true azimuth and error of the compass by true azimuth tables; and, supposing the variation to be 19° E., find the deviation of the compass for the direction of the ship's head at the time.

3. CHART.

Time allowed: Three hours.

1. Deviation card 12: In a vessel steaming towards Cape Brett Lt. Ho. steering by compass N. 30° W. at 9 knots, Henry Island bore by compass S. 22° W. and Home point extreme bore S. 75° W. by compass.

State the position of the vessel, and the distance from Home Point.

2. From the position as found in question 1, set course to reach a position with Coal Point bearing $310^{\circ} 4$ miles distant, maintaining a distance of 1 mile off Cape Brett Lt. Ho. and 2 miles off the outer end of the eastern island of the Cavalli Group. On the last course allow for a current which set 340° (N. $34^{\circ}5$ W. mag.) at the rate of 2.5 knots.

Required—The compass courses steered and the distance made good on each course, and the distance that the log should show when in final position supposing it to have been set at the position off Home Point.

3. When steering on the second compass course Ngakotu Raranui Pt. bore by compass S. 6° W., and after continuing on the same course for 4 miles the south end of Cavalli Is. bore by compass S. 58° W. Assuming that the vessel has made good her course and distance between the bearings, state the position of the vessel and the distance from the south end of Cavalli Is. at the time of taking the second bearing.

4. The following horizontal sextant angles were taken to determine the position of the ship: Between G and D, $42^{\circ} 20'$; between D and F, $37^{\circ} 40'$.

Required—The position of the ship by station pointer.

5. Arriving off Manukau Bar at 14 h. 00 m. New Zealand mean time on 16th September, 1929, state the depth of water you would expect to find on the bar if the soundings on the chart showed $3\frac{1}{2}$ fathoms.

6. Chart 695: Find approximately (without the use of Admiralty or other tide-tables) the time of high water on the afternoon of 14th June, 1929, off Stephens Island, and state also the direction of the tidal stream at 10 h. 00 m. on that day.

4. ENGLISH.

Time allowed: One hour and a half.

Describe fully the survey which a vessel undergoes each year.

SPECIMEN SET OF EXAMINATION-PAPERS FOR SECOND MATE, FOREIGN-GOING.

KNOWLEDGE OF PRINCIPLES.

Paper 1 (3 hours).

- Given $\log 3 = 0.477121$ and $\log 7 = 0.845098$ find, without reference to the logarithm tables, the log of 441.
- Find the volume of steel in a hollow cylinder 14 inches long, the internal and external diameters being 3 inches and $3\frac{1}{2}$ inches respectively.
- Explain clearly what is meant by the Obliquity of the Ecliptic, and supposing the Right Ascension of the Apparent Sun to be $09^{\text{h}}. 53^{\text{m}}. 26^{\text{s}}$., what would be its Declination?
- In the above question explain how you could determine the value of R, given in the Nautical Almanac, from the data therein given.

5. A beacon, 45 ft. high, subtends a vertical sextant angle of $1^{\circ} 10'$. After steering 3 miles it was observed to be abeam. What vertical angle would it subtend after steaming a further $2\frac{1}{2}$ miles on the same course?
6. What is meant by a Sidereal Day and how is the length of a Sidereal Day determined?
7. Show clearly how the sum or difference of the Meridian Zenith Distance of a Heavenly Body and its declination is equal to the Latitude of an Observer.
8. Enumerate and explain the corrections to be applied to an observed sextant angle.
9. Having been given a definite scale of Latitude for a Mercator Chart, explain fully how you could then draw up a scale of Longitude.
10. Draw a figure and trace the changes in the sign and magnitude of the Sine, Cosine, and Tangent of an angle as it increases from 0° to 180° .
11. In Latitude 48° N., on March 7th, 1929, what will be the hour angle of the star α Leonis (Regulus) when its altitude is 37° ?
12. State fully what you know of the Earth's orbit.

PRACTICAL NAVIGATION I.

Paper 2 (2 hours).

1. The Pile Lighthouse off Belfast is charted as 40 ft. high. How high above sea-level would this lighthouse be on 10th November, 1929, at 19h. 00m. standard time. M.H.W.S. 11.1 ft.
2. The departure position being in Lat. 32° S., Long. 33° W., a steamer makes the following true courses and distances: West 310 miles, South 410 miles, East 310 miles. Find the position arrived at.
3. Find, by Mercator's Sailing, the true course and distance from A in Lat. $43^{\circ} 25'$ S., Long. $149^{\circ} 02'$ E., to B in Lat. $40^{\circ} 20'$ S., Long. $172^{\circ} 22'$ E.; and give also the compass course to steer if the variation is $10^{\circ} 30'$ E. and the Deviation is $17^{\circ} 40'$ W.
4. What effect has temperature upon chronometers and why is the temperature an important factor when chronometers are being compared?
5. Chronometer A is 10m. 33s. fast of B. B is 29m. 17s. slow of C. If C is 29m. 18s. fast of G.M.T., find A's error on G.M.T.
6. On 17th December, 1929, the position by D.R. being Lat. $39^{\circ} 50'$ S., Long. $2^{\circ} 06'$ W., the star β Canis Majoris (Mirzam) bore East by compass, the correct G.M.T. being 22h. 04m. 39s.
Find the true bearing of the star and thence the error and deviation of the compass, the variation being 28° W.

PRACTICAL NAVIGATION II.

Paper 3 (3 hours).

1. From the following data find the position of the ship by D.R. at 9 p.m.
 - (1) 2h. 15m. p.m. Tuskar Rock (Lat. $52^{\circ} 12'$ N., Long. $6^{\circ} 12' 20''$ W.) bore N. 70° W., compass (Dev. 4° W., Var. 16° W.), Dist. 7 miles ship's head S. 20° W., Log 25.
 - (2) 3h. 00m. p.m. Course altered S. 70° W. (Dev. 6° W., Var. 16° W.), Log 33.
 - (3) 4h. 00m. p.m. Course altered S. 72° W. (Dev. 6° W., Var. 16° W.), Log 44.
 - (4) 9h. 00m. p.m., Log 100.
2. On 10th June, 1929, at 00h. 38m. (M.T.S. approx.), in Lat. $39^{\circ} 40'$ N., Long. $41^{\circ} 06'$ W., by D.R., the observed meridian altitude of Saturn was $28^{\circ} 11'$ bearing South. Index error $01' +$; Height of eye, 42 ft.
Find the latitude and position line.
3. On 30th June, 1929, at about 12h. 25m. p.m., the D.R. position of the ship being Lat. $39^{\circ} 30'$ S., Long. $100^{\circ} 13'$ W., the observed altitude of the sun's L.L. was $26^{\circ} 59'$. Time by chronometer was 19h. 19m. 00s., being 7m. 25s. fast of G.M.T. Sextant error, $2' 20'' +$; Height of eye, 45 ft.
Find the Latitude and the position line.
4. On 3rd November, 1929, at about 09h. 45m. a.m., the D.R. position being Lat. 51° N., Long. 12° W., the following observations were made: Obs. Alt. Sun's L.L. $17^{\circ} 48'$; G.M.T. 10h. 21m. 29s.; Sextant error, nil; Height of eye, 26 ft.
Find the position line upon which the ship is situated.

5. Following the position line observation in Question 4, the ship steamed 31 miles on a 280° course under the influence of current setting 060° at 1 kn. until noon, when the latitude by Meridian Altitude was found to be $51^\circ 15' N$.
Find the position of the ship at noon.

CHART WORK.

Paper 4 (2 hours).

1. In the western approaches to the Firth of Clyde at 9 p.m. the following bearings by compass were taken. Tory Is. Lt. $S. 54^\circ W$. Fanad Pt. Lt. $S. 16^\circ E$., Inishtrahull Lt. $S. 58^\circ E$.
Find the position of the ship and from it set the compass course to steer (using Dev. Card 1) to pass Inishtrahull five miles distant to the Southward, making allowance for tide setting 070° at 1 knot, and estimate the time at which Inishtrahull will bear 180° . Ship steaming 10 knots.
2. Whilst proceeding with ship's head on the course as given in answer to Question (1) Inishtrahull Lt. bore $S. 15\frac{1}{2}^\circ W$. by compass and Oversay Is. Lt. bore $N. 87\frac{1}{2}^\circ E$. by compass.
Find the position of the ship and from it set the compass course (using Dev. Card 1) to pass Altacary Head Lt. three miles distant.
3. Whilst with ship's head on the compass course set in Question (2) Oversay Is. Lt. bore $N. 68\frac{1}{2}^\circ E$. by compass and 50 mins. later (ship steaming 10 knots) it bore $N. 36^\circ E$. by compass.
Find the position of the ship.
4. What is the object of the Fixed Light and of the Red Light sectors of Fanad Point Lt.?
5. What special precaution should be observed in the vicinity of Hunter's Rock in approaching L. Larne?

CARGO WORK AND ELEMENTARY SHIP CONSTRUCTION.

Paper 5 (3 hours).

1. If you sounded a double bottom tank and found 16 ft. of water, what action should be taken?
2. What is a Displacement Scale?
State its uses.
3. How is the draft of a vessel affected when passing from salt water to fresh water?
Give reason.
The loaded draft of a vessel is 22 ft. 6 in. and the fresh water allowance $5\frac{1}{2}$ in. The vessel is loading in dock, density of water 1016. Calculate drafts forward and aft, to which you would load, vessel to be 6 in. by the stern.
4. What is meant by—
(a) Centre of Gravity,
(b) Centre of Buoyancy?
How is the Centre of Gravity of a ship affected by placing a heavy weight on deck?
5. What are deep tanks, and why are they fitted?
6. Give a brief description of—
(a) Deck Stringer.
(b) Panting Beam.
(c) Beam Knee.
7. What is a bilge keel? Give a rough sketch.
8. What precautions must be taken when loading general cargo for several ports?
9. State fully how a cargo of rice is stowed in a ship.

ENGLISH.Paper 6 ($1\frac{1}{2}$ hours).

Write to a person who has no knowledge of the sea a general explanation of the Regulations for the Prevention of Collisions at sea.

SPECIMEN SET OF EXAMINATION PAPERS FOR FIRST MATE, FOREIGN-GOING.

PRACTICAL NAVIGATION I.

Paper 1 (3 hours).

1. On 11th December, 1929, in cloudy weather, the position by D.R. being in Lat. $39^{\circ} 00' N.$, Long. $141^{\circ} 10' W.$, a "snap" altitude of a bright star, whose identity was not ascertained, was taken as $43^{\circ} 03'$ (corrected). The time by a hack watch was 12h. 48m. 54s., which was found to be 16m. 20s. fast of G.M.T. The approximate bearing of the star was 238° .
Establish the identity of the star.
2. From the following data find the latitude and position line, G.M.T., 3rd March, 1929, 00h. 55m., position by D.R. Lat. $51^{\circ} 35' N.$, Long. $28^{\circ} 30' W.$, Obs. Alt. Pole Star $51^{\circ} 09'$; Height of eye, 26 ft. Sextant error, nil.
3. On 7th October, 1929, at about 16h. 10m. M.T.S. in position by D.R. Lat. $50^{\circ} 20' S.$, Long. $17^{\circ} 10' W.$, an observed altitude of Saturn was $61^{\circ} 46'$; Height of eye, 30 ft. Correct G.M.T. 17h. 19m. 03s.
Find the latitude and the line of position.
4. On 10th November, 1929, at 8.30 a.m. A.T.S. is was ascertained that the ship was on a N. 50° E.—S. 50° W. position line through D.R. Lat. $50^{\circ} 10' N.$, Long. $27^{\circ} 30' W.$, the log registering 97.
At 11.40 a.m. A.T.S. an ex-meridian sight of the sun gave Lat. $50^{\circ} 35' N.$, log 25.
In the interval the ship steered 322° to allow for a current estimated to set 090° at 1 knot.
Find by calculation, or by plotting, the position of the ship at 11h. 40m. a.m.
5. On 10th April, 1929, at about 11h. p.m. the position by D.R. being Lat. $36^{\circ} 20' S.$, Long. $52^{\circ} 10' E.$, the following observations were taken to determine the ship's position:—
 - (a) Obs. Alt. α Centauri to Eastward of Meridian $57^{\circ} 18'$, G.M.T. 19h. 21m. 58s.
 - (b) Obs. Alt. α Leonis (Regulus) to Westward of Meridian $33^{\circ} 49'$, G.M.T. 19h. 23m. 11s.
 The sextant used was correct; Height of eye, 40 ft.
Find the ship's position by means of the position lines.

PRACTICAL NAVIGATION II.

Paper 2 (2 hours).

1. The ship's head by compass being in turn on the eight principal points of the compass, and the compass bearing of a distant object on each course being as stated below, find the magnetic bearing of the object and construct, on squared paper, a deviation curve.

Compass course	N	NE	E	SE	S	SW	W	NW
Compass bearing	S75W	S64W	S56W	S50W	S34W	S31W	S49W	S71W

 From the curve ascertain the deviation for the following compass courses, N.N.E., E.N.E., N.N.W., and W.N.W.
2. The position of the vertex of the Great Circle from A. Lat. $48^{\circ} 26' N.$, Long. $161^{\circ} 24' E.$, to B. Lat. $37^{\circ} 54' N.$, Long. $142^{\circ} 46' W.$, being Lat. $48^{\circ} 46.4' N.$, Long. $170^{\circ} 14.7' E.$ Calculate the latitudes at which the Great Circle track crosses the meridian of 170° E. and each 10th degree of longitude from it towards the destination and plot the track on the Mercator's chart provided.
3. Calculate, by the use of Harmonic Constants, the height of tide at 11h. G.M.T. of 30th May, 1929, off Dover.

CHART WORK.

Paper 3 (2 hours).

1. You are bound from Colombo to Singapore in a low-powered steamer in the S.W. monsoon. Lay off on the general chart provided the true courses you would steer, and the distances to be made good to the entrance to the Malacca Straits. From the entrance lay off on the small-scale chart provided the true courses to be steered, and the distances to be made good to arrive at the Eastern Anchorage. In making the voyage through the Straits mention the salient points for alteration of course, giving a brief description of how you would recognize them in the daytime and the distance off you would pass.

2. What precautions would you take when transferring position from one chart to another?
Why is it advisable to use the compass nearest to the work on the chart?

SHIP CONSTRUCTION AND STABILITY.

Paper 4 (3 hours).

1. Sketch and name the various rolled sections used in ship construction.
2. What is the usual method adopted for distinguishing the strakes and plates of a ship?
3. What is a Web Frame? Give a rough sketch showing how it is built up.
4. Name the different members of the transverse framing in a ship with ordinary floors.
5. Define (a) Reserve buoyancy, (b) Displacement, (c) Centre of gravity, (d) Centre of buoyancy.
6. How does increase of freeboard affect stability?
7. In a vessel of 3,000 tons displacement a weight of 100 tons is moved 20 ft., and a weight of 50 tons moved 10 ft. upwards in a vertical direction. Calculate the effect on centre of gravity.
8. What is meant by a vessel being—
(a) Stiff. (b) Tender.
What effect has the flooding of a double-bottom tank on the stability of a ship?

SHIP MAINTENANCE, ROUTINE, AND CARGO WORK.

Paper 5 (3 hours).

1. Your vessel has sustained damage leaving harbour. Where and how should this be recorded?
2. How often should the crew be exercised at boat drill? Draw up your routine for boat drill.
3. The bilges of your ship are choked and very dirty. State in detail how you would clean them.
4. What precautions must be taken when loading a full cargo of sawn timber?
5. How should a magazine be constructed?
6. The derricks of a vessel are tested to lift 5 tons each, no heavy derrick being available. There is a weight of 6 tons to be lifted out of the hold. What gear would you rig to land this weight on deck?
7. One of the steering chains has carried away. What action would you take?
8. While loading a cargo of sugar a slight leak is observed at one of the frames in the hold. State exactly what you will do.
9. State in detail how you would load a cargo of grain in bulk in the Black Sea.

METEOROLOGY.

Paper 6 (2 hours).

1. Describe briefly a Kew Pattern Marine Mercurial barometer and explain the principle upon which it functions.
2. Describe how you would estimate the force of the wind from the bridge of a steamer under way at sea, using the Beaufort Scale of wind forces; and how you would ascertain its true direction.
3. Describe the wind systems of the North and South Atlantic Oceans, giving their names and the general pressure distribution associated with them.
4. What is "barometric gradient," how is it measured, and how does it affect the force of the wind over the ocean?
5. Describe the structure and characteristics of a tropical revolving storm, also its movements.
6. (a) On a day in the month of September a ship A, in Lat. $20^{\circ} 1' N.$, Long. $65^{\circ} 10' W.$, proceeding on a south-westerly course at 13 knots, observes the signs of a hurricane. The wind is north, a light breeze, barometer 29.94 in. At the same time she receives information from a ship B in Lat. $22^{\circ} 2' N.$, Long. $60^{\circ} 3' W.$, that her barometer is 30.00 in. and the wind from E. by S., force 6.
What is the approximate position of the centre of the storm relative to A and B? (Appropriate chart to be provided.)
(b) In such circumstances what is the correct action for A, and why?
(c) A few hours later, from wireless weather reports, A ascertains that the centre is travelling north-westward. A has experienced an increasing wind which is backing, and her barometer is falling. What should she do now?

SPECIMEN SET OF EXAMINATION PAPERS FOR MASTER,
FOREIGN-GOING.

PRACTICAL NAVIGATION.

Paper 1 (3 hours).

1. On 24th May, 1929, at about 8 h. 05 m. a.m., the position by D.R. being Lat. $48^{\circ} 05' N.$, Long. by account $22^{\circ} 05' W.$, the observed altitude of the Sun's L.L. was $35^{\circ} 57'$. Height of eye, 31 ft. G.M.T., 9 h. 31 m. 29 s.
Find the position line upon which the ship is situated.
Again, at about 3 h. 54 m. p.m. on the same day, the observed altitude of the Sun's L.L. was observed to be $35^{\circ} 54'$. Height of eye as before. G.M.T., 17 h. 11 m. 55 s.
Find the position of the ship at the time of this observation by combining the two observations, the course and distance in the interval being $067^{\circ} 82$ miles. (N.B.—Squared paper only supplied.)
2. Find the A.T.S. of the meridian passage of the star α Canis Minoris (Procyon) on 24th February, 1929, in Lat. $40^{\circ} 10' S.$, Long. $20^{\circ} 18' W.$, by D.R.
3. On 4th August, 1929, at about 11 h. 37 m. a.m., the position by D.R. being Lat. $33^{\circ} 24' S.$, Long. $6^{\circ} 08' E.$, an ex-meridian altitude of the Sun's L.L. was $38^{\circ} 54'$. Height of eye, 25 ft. The correct G.M.T. was 11 h. 18 m. 10 s.
Find the latitude and thence the position line.
4. From Part II, Section II, of the Tide Tables, calculate the height of tide off Penzance on 10th July, 1929, at 03 h. G.M.T.
5. On (given date), 1929, whilst approaching the entrance to the St. George's Channel from the S.W'ward in thick weather, steering 040° , steaming at 4.5 knots, the position by account being Lat. $51^{\circ} 54' N.$, Long. $6^{\circ} 30' W.$, the following casts of the lead were taken at $\frac{1}{4}$ hour intervals corrected to Datum: 32, 31, 30, 28, 29, 32, 28 fathoms, with a bottom of sand in each case, the first cast taken at (given time) G.M.T.
Estimate the position of the ship at time of last cast, and say what alteration of course you would consider necessary to pass 3 miles clear S.E'wards of Tuskar Rock.

METEOROLOGY.

Paper 2 (2 hours).

1. Give a general description of the winds and currents which usually prevail in the month of July in the Arabian Sea; and supposing that you are at Colombo in a medium powered steamer laden and bound for Aden, indicate the track that you would follow and the winds and currents you would expect to encounter along this track, giving your reasons for taking it.
2. (a) Describe the origin of the icebergs which constitute a danger to navigation in the North Atlantic and how they get there.
(b) Are there any reliable indications of the proximity of ice when visibility is bad?
(c) What steps are taken during the ice season in the vicinity of the Grand Banks of Newfoundland to warn shipping of ice; and how are the Trans-Atlantic Lane routes affected by the prevalence of ice?
Where is information of the Trans-Atlantic Lane routes in force to be found? Who is responsible for regulating the routes in force?
3. At 0700 G.M.T. on 11th November, 1929, you are on board the steamship A in Lat. $46^{\circ} 59' N.$, Long. $6^{\circ} 35' W.$, bound for London. You make the following observations at 7 a.m. G.M.T., and receive by wireless reports from selected ships as under. You also receive the British Weather Shipping Bulletin, from which coded coast station reports are as follows.

METEOROLOGY—continued.

SHIPS REPORTS.

Paper 2—continued.

Ship.	Position.		Wind.		Barometer corrected.		Barometer Tendency.	Course.	Speed.	Weather.
	Latitude.	Longitude.	Direction.	Force.	Millibars.	Inches.				
A										
Homeric ..	46° 59' N.	6° 35' W.	S.S.W.	6	998	29.47	Rising	N. 28 E.	13	Overcast.
Montroyal ..	48° 48' N.	23° 36' W.	N.W.	6	1008	29.77	Falling slowly	N. 77 E.	19	Cloudy.
Oranian ..	56° 00' N.	14° 54' W.	North	4	988	29.18	Steady	S. 87 E.	17½	Cloudy.
Orari ..	49° 04' N.	28° 57' W.	S.W.	4	1011	29.86	Falling slowly	N. 75 E.	10½	Overcast, drizzle.
	47° 47' N.	31° 23' W.	W.S.W.	4	1011	29.86	Falling	N. 65 E.	9½	Overcast, drizzle.

BRITISH WEATHER SHIPPING BULLETIN.

Station Reports 10307, 85000, 20128, 82064, 32357, 81276, 45306, 84166, 52018, 90228, 61118, 99186, 71118, 01166, 80027, 01157, 90167, 91164, 00518, 88143.
Foreign 10013, 94083, 20117, 11063.

Decode these reports using the International Weather Code Tables, and plot all the observations on the accompanying chart. Draw the isobars, and state what system is governing the prevailing weather; and supposing that A maintains a speed of 13 knots, what weather is she likely to experience during the next 12 hours from observation time?

SHIP CONSTRUCTION AND STABILITY.

Paper 3 (3 hours).

1. What are Lloyd's Numerals and how are they obtained?
2. Sketch in outline, a midship section of a ship built with ordinary floors, naming the various parts.
3. How is continuity of strength provided at the break of a Raised Quarter Deck?
4. What is a "joggled plate"? State its advantages and disadvantages.
5. What are the main features governing Freeboard assignment?
6. What is the effect of concentrated loads in a ship? What would you consider a bad distribution of weight and buoyancy?
7. A box shaped vessel 210 ft. in length, 32 ft. beam, and 16 ft. depth floats on an even keel at draft of 8 ft. The G.M. is 2.8 ft. Calculate new G.M. after placing 64 tons on deck, vessel remaining on even keel.
8. A box shaped vessel of same dimensions as above floats on an even keel at 8 ft. draft. A weight of 50 tons is moved 40 ft. forward in a horizontal direction. Calculate change of trim.

ENGLISH.

Paper 4 (2 hours).

You have been discharging a coal cargo by means of grabs. Damage was done to a bulkhead, some of the hold ladders were bent, and tanktop dented in several places.

Write a letter (1) to the party responsible for doing the damage, setting out your claim; (2) write a letter to your owners after damage has been repaired to your satisfaction.

SHIP'S BUSINESS.

Paper 5 (2 hours).

1. What is an Official Log? What are the chief entries to be made therein?
2. A seaman reports sick at sea. What action do you take?
3. What is meant by "Clearing Outwards"?
Where do you go to clear the vessel and what documents do you require to clear from the U.K.?
4. In a foreign-going steamer of 5,000 tons gross, what certificated men must be carried?
5. What are the chief items embodied in a Charter Party?
6. You have drawn freight in a foreign port and wish to remit it to your owners. How would you do it?
7. What is Particular Average?
8. State the functions of a Classification Society.
9. What Life-Saving Appliances is a foreign-going steamer required to carry?
10. Sketch the loadline markings on the starboard side of a steamer, 300 ft. in length.

MAGNETIC COMPASS.

Paper 6 (2 hours).

1. What effect has the change in strength of the Earth's Horizontal Force upon the value of the deviation of the compass? Give your answer in full by examining the effect upon the deviation caused by each of the coefficients A, B, C, D, and E.
2. If the Deviation of the compass caused by hard iron when heading South, where the H.F. = 1.1, is 10° W., find the deviation from the same source when the H.F. = 1.6.
3. Should the compensation of that part of Coefficient B, caused by soft iron, be made before or after the heeling error is corrected? Give full reasons.
4. Describe clearly how you would proceed to find the value of Coefficient D., and having found it, how would you proceed to correct it?
5. All other errors having been properly corrected, the heeling error of compass situated at middle length of a ship built in a high North latitude is carefully corrected by a vertical magnet (Red end up) under the compass. What alteration, if any, in the position of this magnet would you expect to be necessary to ensure the absence of heeling error as the ship proceeded on a passage towards a high Southerly latitude?
6. What difference, if any, is there between the compensation of heeling error of a compass with a carefully corrected + D. and that of a compass with a similarly corrected - D., the D. in both cases being caused by an athwartships arrangement of iron?

ENGINEERING KNOWLEDGE.

Paper 7 (3 hours).

1. What is meant by the "pitch" of a screw propeller? If the pitch of propeller is 18 ft. and the number of revolutions 86,470, calculate the slip if the day's run by log is 243 miles.
2. What is meant by "circulating" the boilers? How much notice should be given to raise main steam on ordinary multitubular marine boilers?
3. What is meant by—
(a) Welding.
(b) Caulking.
4. What are water-gauges and where are they placed? Of what use are they?
5. What is meant by the tail end shaft being down? If the wear down is excessive, what does this entail?
6. Give a brief description of—
(a) Bottom end.
(b) Thrust block.
(c) Hotwell.
7. How does coal consumption vary with regard to speed?
A vessel steams 12 knots on a daily consumption of 42 tons of coal. Calculate the consumption when speed is reduced to 10 knots.
8. Describe the principle of any refrigerating system with which you are acquainted.

SPECIMEN SET OF EXAMINATION PAPERS FOR EXTRA MASTER.

MATHEMATICS.

Paper 1 (3 hours).

1. A glass tumbler is partly filled with mercury (Sp. G. 13·6) in which is floating a 1 in. diameter sphere of alloy (Sp. G. 7·3). The remaining space is filled with fresh water, when it is found that the mercury occupies half the depth of the tumbler. If the inside diameters, top, and bottom of the tumbler are 3 and 2 in. respectively and the inside depth is 5 in., find the weight of its contents.
2. Two points of land are in transit bearing N. 40° W. from a steamer. On a westerly course the horizontal angle became maximum at 22° at the steamer after making 9·5 miles.
If the two points are 4 miles apart, find the course made good by the steamer.
3. Assuming the identities involving the Sine and Cosine of the half angles, deduce the formula for the solution of a spherical triangle.

$$\frac{\sin a}{\sin A} = \frac{\sin b}{\sin B} = \frac{\sin c}{\sin C}$$

4. Find the correct G.M.T. when the two stars α Ursa Majoris (Dubhe) and ϵ Ursa Majoris (Alioth) are at the same altitude at a position Lat. 60° N. Long. 30° W. on 25th June, 1929.
5. A steamer finds that by increasing her normal speed by 1 knot she can make a 2,640 mile passage in one day less. What is her normal speed?

GENERAL SCIENCE.

Paper 2 (3 hours).

(Only 8 of these Questions to be answered.)

1. A crank 15 in. long is driven by a piston and makes 140 revolutions per minute. Find the acceleration of the piston when it is $3\frac{1}{2}$ in. from the end of its stroke, taking the motion as simple harmonic motion.
2. What do you understand by the term Pressure, and in what units is it measured?
If a diver's tank has a volume of 2 cubic feet and contains air under a pressure of 30 atmospheres, to what extent will the air expand when it is released at a depth of 17 fathoms of water?
3. A load of 8 tons is lifted by a hydraulic press when an effort of 15 lb. is applied on the end of a 14 to 1 lever. Assuming an efficiency of 90 per cent., find the proportion between the diameter of the ram and the plunger.
4. Explain what is meant by the conservation of energy and momentum.
Two equal masses are attached to a rope passing over a light frictionless pulley. One mass is supported by means of a table and the other is raised 30 in. and then allowed to fall freely through that distance.
Find the velocity of the two masses after the rope has become tight.
5. A force of 14 lb. weight is applied at the end of a lever 3 ft. long in order to tighten up a nut on a screw bolt, 1 in. in diameter and with 8 threads to the inch. If the breaking tension of the material of the bolt is 14·4 tons per square inch, show that the bolt will just break.
6. Define the term Centre of Pressure.
Part of the side of a reservoir is a door A, B, C, D. The lower side C, D is horizontal, while the side A, B is hinged so that the door can turn freely. If the lengths of A, B and C, D are 2 ft. and 12 ft. respectively, what force must be exerted at the mid point of C, D in order to keep the door shut when the level of the water is at A, B?
7. A piece of wood weighing 40 lb. and specific gravity 0·75 is tied by a rope to the bottom of a tank of water so as to be totally immersed. What is the tension on the rope?
8. What is the meaning of Dew Point?

Describe some method of determining the Dew Point and show how to obtain the other quantities which are required in order to calculate the humidity of the air.

9. How are the eclipses of the sun and moon produced? Illustrate your answer by diagrams.
10. Account for the formation of a large number of images by two parallel mirrors. Illustrate your answer by a carefully drawn diagram.
11. Draw a diagram which will show the paths of rays of light through a telescope. How may the magnifying power be obtained?
12. Explain why the note of a siren seems different in pitch when a steamer is approaching and when it is receding from you.

NAVIGATION.

Paper 3 (3 hours).

1. What are the general principles underlying the construction of Special Tables for finding Position Lines? Explain how these principles are applied in particular to any such tables that you are familiar with.
2. Explain, with sketches if necessary, how you would know whether the failure of three bearings to intersect at a common point is due to an error common to all three bearings or to errors in the individual bearings, and say also what position you would consider to be the position of the ship on the chart, having proved the failure to be due to the second reason.
3. Explain the construction and use of a vernier, taking as an example the sextant, the arc of which is divided to 10', the vernier affording a degree of accuracy of 10".
4. Describe in detail the principle of a Rotating Wireless Beacon, and explain in detail how such a beacon can be used to facilitate coastal navigation.
5. Calculate the height of the tide off Dover at 04 hrs. G.M.T. on 10th December, 1929, by means of the Harmonic Tidal Constants.
6. Explain the course and speed errors of the Gyro compass. Find the error on such a compass in Lat. 50° N., ship steaming 12 knots, course 320°.

CHART WORK.

Paper 4 (2 hours).

1. Discuss in detail the advantages and disadvantages of the position line by horizontal angle when used with another such line to determine the ship's position.
2. Draw sketches and describe in detail the use which may be made of one or more fixed objects on shore to ensure the safety of the ship when in the vicinity of hidden dangers.
3. How would you proceed to find the distance off a known object by vertical angle when the height of the object is known but its base is beyond the horizon?
4. Describe briefly, the usual method employed in reproducing and printing Admiralty Charts.

CHART CONSTRUCTION AND MARINE SURVEYING.

Paper 5 (3 hours).

1. Construct a plan to Natural Scale $\frac{1}{20800}$ between the limits 52° 02' 30" and 52° 06' North Lat. and 7° 31' and 7° 37' West Long., and give a scale of Lat. and Dist. but no compass.
2. On the plan so constructed insert the following positions:—
Wyse Pt. F.S. Lat. 52° 05' N., Long. 7° 34' 12" W.
Ballinacourty Pt. F.S. Lat. 52° 4' 40" N., Long. 7° 33' 10" W.
Helvich Harbour Lt. Ho. Lat. 52° 3' 18" N., Long. 7° 32' 42" W.
Two sounding boats A and B are in such positions that from A the observed angles were Wyse 50° 30', Ballinacourty 84° 40', Helvich, and from B the observed angles were Wyse 33° 15', Ballinacourty 117° 40', Helvich.
Find the distances of each boat from Ballinacourty and Helvich respectively.
3. Write a brief description of the use of the Tide Pole to reduce tidal sounding to Chart Datum.

MAGNETISM AND ELECTRICITY INCLUDING THE MAGNETIC COMPASS.

Paper 6 (3 hours).

1. The ship's head having been swung to the eight principal points of the compass the following were the bearing of a distant object :—

Ship's Head Bearing.	N	NE	E	SE	S	SW	W	NW
	N ³ E	N ¹² W	N ¹⁸ W	N ¹⁴ W	N ¹¹ W	N ⁸ W	N ² E	N ¹⁰ E

Find the values of the approximate coefficients A, B, C, D, and E; determine the deviations for the 9 points of the N.E. quadrant of the compass, and describe in detail how you would utilize your knowledge of the coefficients in adjusting the compass.

2. Is the direction of the ship's head, when building, of any practical value to a compass adjuster?

Give full reasons for your answer.

3. The compass having been adjusted in the English Channel, H.F. 1.0 Dip. 63°, coefficient B — 10° was corrected by 12 in. of 3 in. diameter Flinders bar and a permanent magnet 24 in. from the compass needles.

Later, off Cape Verde, H.F. 1.6 Dip. 25°, a deviation of 3° W. developed on Westerly courses.

Find what alteration should be made in the amount of Flinders bar and in the position of the permanent magnet to properly adjust Coefficient B. (N.B.—Ignore coefficient E and possible Gaussin error.)

4. If 40 ft. of wire .04 in. thick has a resistance of 3 ohms, find the resistance of 1,000 ft. of wire of the same metal .06 in. thick.
5. Why is a zinc-copper couple more effective than a zinc-iron couple when dilute sulphuric acid is the exciting liquid in a simple voltaic cell?

6. Explain clearly the regular and irregular changes in Magnetic Variation.

7. What relation has the power of a permanent correcting magnet in a binnacle, and its distance from the compass card, upon the deflection caused?

8. A compass needle 5 cm. long and whose poles are of unit strength lies in the magnetic meridian. Variation 45° E.

A disturbing magnet of same length and strength as the compass needle is introduced lying in the true meridian Blue end North, its centre being 10 cm. East (true) from the centre of the compass and in the same horizontal plane. Calculate the initial moment, clockwise or anti-clockwise, tending to deflect the compass.

CONSTRUCTION, WORKING, AND UPKEEP OF SHIPS.

Paper 7 (3 hours).

1. What information is usually given in the Register of a Registration and Classification Society?

What is the object of this register?

2. What special provision is made in coasting vessels which are required to load aground?

3. Show by sketches the structural arrangements in a double bottom tank, having floors on alternate frames.

4. What is the object of inclining the light ship? Describe the experiment and state the conditions necessary to ensure accurate results?

5. What is Synchronism? How and why should it be avoided?

6. The half ordinates of a vessel's waterplane are 0.1, 6.7, 9.5, 10, 10.2, 10, 9.8, 8.8, and 1.8. Common interval 16.2 ft.

Calculate tons per inch immersion.

7. Show that for small angles of heel the position of the Metacentre is determined by the Moment of Inertia of Waterplane and the Volume of Displacement, i.e. :—

$$BM = \frac{I}{V}$$

COMMERCIAL AND LEGAL KNOWLEDGE.

Paper 8 (2 hours).

1. What procedure should be followed by a shipmaster in dealing with the property of a seaman who dies during a voyage?
2. What is meant by the expressions "Emigrant Ship" and "Steerage Passenger"?
3. To what benefits is a Seaman entitled under the National Health Insurance Act?
4. To what limits is the owner of a ship liable in respect of loss of life or injury to passengers and in respect of goods lost or damaged?
5. Detail fully the hands and channels through which a Bill of Lading passes from the time it is first signed by the Master onwards.
6. Discuss the advantages and disadvantages of Floating Docks as compared with Graving Docks.

OCEANOGRAPHY AND ECONOMIC GEOGRAPHY.

Paper 9 (3 hours).

1. A drift bottle thrown overboard at a position east of the Canary Islands, was eventually picked up on the West Coast of Ireland. Give your opinion as to the probable track this bottle made, and your reasons, and state what you estimate would have been its daily drift at any six positions you select.
2. Describe how, on board a vessel at sea, you would determine the (1) the length, (2) period, (3) velocity, of ocean waves.
3. If 30 ft. of sea water exert the pressure of one atmosphere, what depth of water would reduce the volume of air in a sounding tube to one-fourth of its original volume (approx.).
4. Describe briefly the causes of a tidal bore, and name any localities where such bores are experienced.
5. Discuss the causes of "Katabatic" and "Anabatic" winds, and name any well-known example.
6. Where are the principal sources of commercial sulphur; also mention any of its uses commercially.
7. Give a brief account of the shipping activities of the port of Buenos Aires, the facilities for handling both the vessels and the principal exports of the port.

APPENDIX G.

SIGHT TESTS.

DETAILS AS TO THE CONDUCT OF THE TESTS.

These tests must be conducted under the strict personal supervision of the Examiner. A careful record must be kept of all mistakes made by the candidate, both in the letter test and in the lantern test.

Each Examiner must keep a record of all candidates passed by him for reference when required.

Spectacles not allowed.—During the examination in the sight tests candidates must not be allowed to use spectacles or glasses of any kind, or any other artificial aid to vision.

I. Letter Test.

1. *Letter Test to be passed first.*—The first test which the candidate is required to undergo is the letter test, and until he has passed this test he must not be allowed to proceed further with the examination.

2. *Apparatus used.*—The letter test to be used for all candidates is that conducted on Snellen's principle by means of sheets of letters.

3. *Object of the Test.*—The object of the letter test is to determine whether the candidate can reach a sufficient standard of visual acuteness, or, in other words, to find out whether his eyesight is good or bad.

4. *Standard of Vision required.*—Every candidate for a first certificate of competency will be required to possess normal vision. With the exceptions indicated below (see paragraph 7), every candidate for a second or higher certificate will be required to possess normal vision.

“Normal vision” is defined, for the purpose of these Regulations, as ability to read correctly nine of the twelve letters in the sixth line and eight of the fifteen letters in the seventh line of a test sheet placed in a good light at a distance of 16 ft. from the eye.

The candidate will have the option of using either eye separately or both eyes together.

5. *Method of Testing.*—The test-sheets should be hung on the wall, in a good light, but not in direct sunlight, at a height of 5 ft. or 6 ft. from the ground. The candidate should be placed at a distance of exactly 16 ft. from the sheets, and exactly opposite them. This distance should be carefully measured, and should never in any circumstances be varied.

One of the sheets should then be exposed, and the candidate should be asked to read the letters on each sheet, beginning at the top and going downwards. Any mistakes which he makes should be carefully noted. If then it is found that he has read correctly at least nine letters in the sixth line and eight letters in the seventh line of a sheet the candidate may be considered to have normal vision, and should be marked “passed” in the appropriate column of the form of application (Exn. 2 or Exn. 2B, as the case may be).

6. *Passing or Failure.*—If at the conclusion of the test the candidate is found to reach the required standard, he may be considered to have passed, and the Examiner should proceed with the lantern test. If the candidate fails to reach the standard required for the certificate entered for, he should be tested with at least four sheets, and the Examiner should fill in a form Exn. 17B, and should forward it with any remarks he may wish to make, to the Principal Examiner for his instructions as to whether the candidate is to be regarded as passing or as failing in the letter test.

Failure to pass the letter test is due to some defect in form vision, and the Board are advised that such defects are sometimes curable. Whenever, therefore, a candidate fails to pass this test the Examiner should advise him to consult an ophthalmic surgeon with a view to ascertaining what is the nature of the defect in his form vision, and whether it is curable.

7. *Lower Standard required in certain Cases.*—Candidates who are in possession of certificates obtained before 1st January, 1914, may be regarded as passing the letter test if they can read correctly with both eyes at least five of the eight letters in the fifth line of a test-sheet.

8. *Tests to be varied.*—The Examiner should take care, by varying the order of the test-sheets and by every other means in his power, to guard against the possibility of any deception on the part of the candidate.

9. *Result of Examination to be reported.*—The result of every examination in the letter test should be reported, in the case of a candidate for a certificate of competency, to the Principal Examiner on forms Exn. 2 and Exn. 14; and, in the case of a candidate for the sight tests only, on form Exn. 2B.

II. Lantern Test.

10. *Apparatus.*—A special lantern and a mirror have been provided for this test. The lantern should be placed directly in front of the mirror, so that the front part of the lantern is exactly 10 ft. from the mirror. Care should be taken that the lantern is properly placed, that is to say, the lights reflected in the mirror must show clearly when viewed from the position of the candidate on the left of the lantern. The Examiner should always satisfy himself that these conditions are fulfilled before commencing the examination.

11. *Darkness Adaptation.*—It is essential that a candidate should be kept in a room which is either completely or partially darkened for at least a quarter of an hour before he is required to undergo this test.

Before the examination commences the Examiner must satisfy himself that the room in which it is conducted is so darkened as to exclude all daylight.

12. *Method of Testing.*—The lantern supplied for the examination is so constructed as to allow one large or two small lights to be visible, and is fitted with twelve glasses of three colours—red, white, and green. At the commencement of the examination the Examiner should show to the candidate a series of lights through the large aperture, and should require him to name the colours as they appear to him. Care should be taken in showing the white light to emphasize the fact that this light is not a pure white. If a candidate makes a mistake of calling this light “red,” a proper red light should be shown immediately after and the candidate’s attention directed to the difference between the two.

After a series of lights through the large aperture has been shown, the Examiner should make a complete circuit with the two small apertures, requiring the candidate to name the colours of each set of two lights from left to right. To prevent any possibility of the order in which the lights are arranged from being learnt, the Examiner should at least twice in each circuit go back a varying number of colours.

A record of any mistakes made with either the large aperture or the two smaller apertures should be kept on form Exn. 17B in accordance with the instructions thereon. In all such cases the mistakes made by a candidate in the letter test should also be recorded on the form.

13. *Passing or Failure.*—If a candidate with either the large aperture or the two smaller apertures of the lantern mistakes red for green or green for red, he should be considered to have “failed” in the lantern test.

If the only mistake made by the candidate with the lantern is to call the white light “red,” and if after his attention has been specially directed to the difference between the two he makes no further mistake of this nature, he should be considered to have passed in the lantern test.

If a candidate makes any other mistake with the lantern—*i.e.*, if he calls white “red” repeatedly or red “white” at all, or confuses green and white, his case should be submitted to the Principal Examiner of Masters and Mates and he should be told that the decision as to whether he is passed or failed, or a further examination is necessary, will be communicated to him in due course. Pending the receipt of the Principal Examiner’s instructions such a candidate should only be allowed to proceed with the remainder of the examination for a certificate of competency on the express understanding that the latter examination will be cancelled in the event of failure in the Sight Tests.

14. *Further Examination and Appeals.*—If in the cases covered by the preceding paragraph the Principal Examiner decides that a further examination is necessary, arrangements will be made for a special examination to be held, and the second-class travelling-expenses necessarily incurred by a candidate in attending such an examination will be paid by the Marine Department, together with a subsistence allowance at a rate which will be notified to the candidate, but which will not in any circumstances exceed 10s. for each day necessarily occupied in attending the examination. In these cases the above expenses will be paid whatever may be the result of the final examination.

If, however, on the report of the local Examiner the Principal Examiner decides that the nature of the mistakes made shows conclusively that a candidate’s sight is so defective as to render him unfit to hold a certificate, the candidate shall be considered to have failed.

In cases where, upon the report of the local Examiner, a candidate is failed by the Principal Examiner, as well as in the cases covered by subpara. 13, the Marine Department will be prepared to allow a candidate who is dissatisfied with this decision to appeal for a special examination; but the Marine Department will not pay the travelling-expenses of any such candidate unless he is reported by the Special Examiners conducting the appeal examination to have passed.

III. Reports.

15. *Reports.*—The result of every test must be reported to the Principal Examiner on forms Exn. 2 and Exn. 14 when the candidate is up for a certificate of competency and on form Exn. 2B when the candidate is up for examination in the sight tests only.

All cases of failure should also be reported to the Principal Examiner on form Exn. 17B, containing the record of any mistakes made with the lantern.

Every report relating to such an examination must be signed by the Examiner who conducted the examination.

APPENDIX H.

SIGNALS TO BE MADE BY SHIPS WANTING A PILOT.

In the Daytime.—The following signals, numbered 1, 2, 3, and 4 when used or displayed together or separately, shall be deemed to be signals for a pilot in the daytime, viz. :—

1. To be hoisted at the fore, the Union Jack, having round it a white border, one-fifth of the breadth of the flag; or
2. The International Code pilotage signal indicated by PT.; or
3. The International Code Flag S, with or without the Code Pennant over it; or
4. The distant signal, consisting of a cone point upwards, having above it two balls or shapes resembling balls.

At Night.—The following signals, numbered 1 and 2, when used or displayed together or separately, shall be deemed to be signals for a pilot at night, viz. :—

1. The pyrotechnic light, commonly known as a blue light, every fifteen minutes; or
2. A bright white light, flashed or shown at short or frequent intervals just above the bulwarks, for about a minute at a time.

If a master of a vessel uses or displays, or causes or permits any person under his authority to use or display, any of the pilot signals for any other purpose than that of summoning a pilot, or uses or causes or permits any person under his authority to use any other signal for a pilot, he shall for each offence be liable to a fine not exceeding twenty pounds. (Merchant Shipping Act, 1894, Section 615 (3).)

APPENDIX I.

SEA SERVICE REQUIRED TO QUALIFY FOR EXAMINATION FOR CERTIFICATES OF COMPETENCY.

The following is a condensed statement of the sea service required to qualify in each of the various grades of certificates of competency. Where service as an officer is required it is shown in tabular form. The letter F is used as denoting foreign-going and H as denoting home trade: thus, 1½F in the first column of the table showing the officer's service for a First Mate's Certificate means 1½ years' service in foreign-going ships; Mate H in the last column means mate of a home-trade ship; and so on.

A candidate for sailing-ship endorsement must show that at least twelve months of his service has been spent in square rigged sailing ships (*see para. 73*).

CERTIFICATES FOR FOREIGN-GOING SHIPS.

SECOND MATE (FOREIGN-GOING).

Minimum age, 20 years.
Minimum sea service, 4F or 6H.
No officer's service required.

FIRST MATE (FOREIGN-GOING).

Minimum age, 21½ years.
Minimum sea service, 5½F or 8½H.
Officer's service as follows :—

Years.	Lowest Capacity.	Lowest Certificate required.
1½ F. ..	Third of 3 watch-keeping officers ..	2nd Mate F.
	Or	
2¼ H. ..	Only Mate or First Mate ..	2nd Mate F.

NOTE.—In certain circumstances service as Second Mate in the home trade may be accepted (*see para. 112*).

MASTER OR EXTRA MASTER (FOREIGN-GOING).

Minimum age, 23 years.

Minimum sea service, 7 F or 10½ H.

Officer's service as follows :—

Years.	Lowest Capacity.	Lowest Certificate required.
1½ F. ..	First Mate	First Mate F.
	Or	
2½ H. ..	Only Mate or First Mate	First Mate F.
	Or	
2 F. ..	Second of 3 watch-keeping officers..	1st Mate F.
	Or	
2½ F. ..	Third of 3 watch-keeping officers ..	1st Mate F.
	Or	
3 H. ..	Master	2nd Mate F. or Master H. for one year of such service.

NOTE.—In certain circumstances service as second mate in the home trade may be accepted. (See para. 112.)

CERTIFICATES FOR HOME-TRADE SHIPS.

The sea service required for these certificates may have been performed either in the home-trade or in foreign-going ships; a portion of which (denoted in brackets with the letters XL) may have been performed in extended river limits.

SECOND MATE.

Minimum age 19 years. Minimum sea service, 3 years (2 XL).
No officer's service required.

MATE.

Minimum age, 20 years. Minimum sea service, 4 years (2 XL).
No officer's service required.

MASTER.

Minimum age, 23 years. Minimum sea service, 5 years (2 XL).
Officer's service as follows :—

Years.	Lowest Capacity.	Lowest Certificate held.
1 H.T. ..	Only mate	Mate H.T. or second mate F.
	Or	
2½ H.T. ..	Second mate in charge of watch	Mate H.T. or second mate F.
	Or	
1½ H.T. ..	Second mate of a H.T. ship required to carry such	Mate H.T. or second mate F.
1 H.T. ..	Master of H.T. V.	Master H.T. V. under 25 tons.
1 H.T. ..	Master of H.T. V. of 50 tons or upwards	Service certificated master 50 tons or upwards.
1½ H.T. ..	Master	Service certificated master under 50 tons.

MASTER OF A CARGO VESSEL UNDER 25 TONS.

Minimum age, 23 years. Minimum sea service, 4 years (2 XL).
No officer's service required.

MASTER OF A FISHING-BOAT.

Minimum age, 23 years. Minimum sea service, 4 years (2 XL).
No officer's service required.

MASTER OF A RIVER STEAMER.

Minimum age, 23 years. Minimum sea service, 2 years (XL).
No officer's service required.

MASTER OF A HARBOUR OR RIVER SAILING-SHIP.

Minimum age, 23 years. Minimum sea service, 2 years (XL).
No officer's service required.

APPENDIX J.

CERTIFICATE OF WATCH-KEEPING SERVICE.

FOR A FIRST MATE'S CERTIFICATE.

THIS is to certify that Mr. _____ has served on the s.s. _____ from _____ to _____ in the capacity of *(1st) (2nd) (3rd) Watch-keeping Officer. During this time Mr. _____ was an officer in effective charge of a watch for eight hours out of every twenty-four hours at sea.

Watches were not doubled at any time during the voyage.†

Watches were doubled between the following dates

and during this time Mr. _____ served as the { *senior } of two junior } bridge-keeping officers.‡

An entry to this effect has been made in the mate's log.

.....
Signature of Master.

* Obliterate the words that do not apply.

† Delete this paragraph if watches were doubled at any time during the voyage.

‡ Delete this paragraph if watches were not doubled at any time during the voyage.

CERTIFICATE OF WATCH-KEEPING SERVICE.

FOR A MASTER'S CERTIFICATE.

THIS is to certify that Mr. _____ has served on the s.s. _____ from _____ to _____ in the capacity of *(1st) (2nd) (3rd) Watch-keeping Officer. During this time Mr. _____ was an officer in sole charge of a watch for eight hours out of every twenty-four hours at sea.

Watches were not doubled at any time during the voyage.†

On all occasions on which watches were doubled during the voyage Mr. _____ served as the senior of two bridge-keeping officers.‡

An entry to this effect has been made in the mate's log.

.....
Signature of Master.

* Obliterate the words that do not apply.

† Delete this paragraph if watches were doubled at any time during the voyage.

‡ Delete this paragraph if watches were not doubled at any time during the voyage.

APPENDIX K.

APPROVED SCHOOLS OF NAUTICAL TRAINING ON SHORE.

The following is a list of schools of nautical training (other than the Nautical College, Pangbourne, see paragraph 125) which the Board have approved under paragraph 126 of the regulations :—

A.—RESIDENTIAL TRAINING ESTABLISHMENTS. (Para. 126 (i).)

Wallasey, Cheshire: The Lancashire and National and Sea Training Homes, Withins Lane, Liscard, Cheshire.

Half time to count up to a maximum of 6 months.

B.—CADET COURSES AT JUNIOR TECHNICAL SCHOOLS AND SIMILAR INSTITUTIONS. (Para. 126 (ii).)

Cardiff: Smith Junior Nautical School, Cardiff.

Hull: Boulevard Nautical School, Hull.

Glasgow: Royal Technical College, George Street, Glasgow.

Greenock: Watt Memorial School, Dalrymple Street, Greenock.

Leith: Leith Nautical College, Commercial Street, Leith.

London: L.C.C. School of Engineering and Navigation, Poplar, London, E.

Half time to count in each case up to a maximum allowance of six months.

C.—SENIOR COURSES IN NAVIGATION. (Para. 126 (iii).)

Aberdeen: Robert Gordon College, School Hill, Aberdeen.

Cardiff: Cardiff Technical College, Cathay's Park, Cardiff.

Dundee: Dundee Technical College, Bell Street, Dundee.

Glasgow: Royal Technical College, George Street, Glasgow.

Leith: Leith Nautical College, Commercial Street, Leith.

Liverpool: Liverpool Technical College, Central Technical School, Byrom Street, Liverpool.

London : L.C.C. School of Engineering and Navigation, Poplar, London E. ; King Edward VII Nautical School, Limehouse, London E. ; Sir John Cass Nautical School, Aldgate, London E.

Plymouth : Plymouth Navigation School, Plymouth.

South Shields :—Marine School of South Shields, South Shields.

Half time to count in each case up to a maximum allowance of three months.

APPENDIX L.

LIST OF COLONIAL CERTIFICATES AS MASTER OR MATE ISSUED UNDER ORDER IN COUNCIL WHICH ARE OF THE SAME FORCE AS THOSE GRANTED BY THE BOARD OF TRADE.

NOTE.—With the exception of those made after 1906 all of the Orders in Council enumerated below were consolidated and superseded by an Order in Council dated 9th May, 1891, which, as subsequently amended by an Order in Council of 22nd October, 1906; and by the Order of 11th October, 1923, relating to Australia, remains in force.

Colony.	Certificates.		Date of Original Order in Council.	Date from which Order in Council takes effect.
	By whom granted in Colony.	Description.		
§Victoria ..	*Marine Board	Master ; 1st Mate ; Only Mate ; 2nd Mate	30 Mar., 1871	4 Jan., 1870
Canada ..	The Minister of Marine and Fisheries	Master ; 1st Mate ; Only Mate ; 2nd Mate	19 Aug., 1871	19 Aug., 1871
New Zealand	Marine Department	Master ; 1st Mate ; Only Mate ; 2nd Mate	9 Aug., 1872	1 May., 1872
§New South Wales	†Department of Navigation	Master ; 1st Mate ; 2nd Mate	30 Aug., 1873	18 June, 1872
§South Australia	Marine Board	Master ; 1st Mate ; Only Mate ; 2nd Mate	12 May, 1874	12 May, 1874
§Tasmania	Governor ..	Master ; 1st Mate ; Only Mate ; 2nd Mate	12 Feb., 1876	1 April, 1876
Bengal ..	Lieutenant-Governor	Master ; 1st Mate ; Only Mate ; 2nd Mate	27 June, 1876	27 June, 1876
Newfoundland	Governor ..	Master ; 1st Mate ; Only Mate ; 2nd Mate	14 May, 1877	14 May, 1877
Bombay ..	Governor ..	Master ; 1st Mate ; Only Mate ; 2nd Mate	11 July, 1877	11 July, 1877
§Queensland	Marine Board	Master ; 1st Mate ; 2nd Mate	26 Mar., 1878	1 Oct., 1877

* The Steam Navigation Board was superseded by the Marine Board on the 21st December, 1888. (See Order in Council of 23rd November, 1893.)

† The Marine Board was superseded by the Department of Navigation on the 17th March, 1900.

§ The issue of certificates of Imperial validity by the Governments of the separate States of the Commonwealth of Australia ceased on the 1st October, 1923, the date on which the issue of such certificates was undertaken by the Commonwealth Government.

NOTE.—The Orders in Council giving Imperial validity to certificates of competency issued in Malta and Mauritius were revoked by an Order in Council dated 18th August, 1916.

Colony.	Certificates.		Date of Original Order in Council.	Date from which Order in Council takes effect.
	By whom granted in Colony.	Description.		
Hong Kong	Governor ..	Master ; 1st Mate ; Only Mate ; 2nd Mate	31 Dec., 1883	1 Jan., 1884
Straits Settlements	Governor ..	Master ; 1st Mate ; 2nd Mate	1 May, 1890	1 June, 1890
Commonwealth of Australia	Minister of Trade and Customs	Master ; 1st Mate ; 2nd Mate	11 Oct., 1923	1 Oct., 1923

By Authority : W. A. G. SKINNER, Government Printer, Wellington.—1930.